NATURE MAGAZINE
VOLUME 29 · APRIL · 1937 · NUMBER 4

Unlocking the Past in Canada's Rocky Mountains

By CARROLL LANE FENTON

Photographs by the author; frontispiece courtesy Canadian Pacific Railway

GLACIERS grind their way down cliffs that once were sands in shallow bays. Trails made by shoal-loving snails stand in pinnacles that rise above spectacular passes. Cliffs tell tales of bygone earthquakes, while waterfalls plunge into canyons once filled by slowly moving ice.

Such scenes, recalling earth's long past, greet visitors to Banff and Lake Louise. They tell the story of Canada's finest mountains: of their peaks, ranges, valleys and lakes. They also tell of high adventures, during which marine basins moved upward and the mountainous West was made.

Standing on the terrace at Banff, we trace chapters in this story. Gray limestones in the Fairholme Range became sea muds that settled and hardened during the Carboniferous Age. Corals and shells lived upon them, but were killed by an epoch of rough water and shallows that covered the sea bottom with sand. We see its thick beds in Tunnel Mountain, though Bow Falls cross strata of dark, soft shale that formed millions of years later. In valleys to the eastward are mudstone and coal, some layers containing fine fossils. They tell us of swamps and cycad-fringed glades where dinosaurs with armor and hooked beaks browsed during the Age of Reptiles. Other dinosaurs had dagger-shaped teeth and walked on long, muscular legs. They prowled among the palm-like trees, ready to pounce upon their neighbors and turn them into meals of fresh meat.

The great reptiles thus harassed each other. They also were terrified by earthquakes that grew common and violent as the earth's crust wrinkled and the Rockies began to rise. Swamps shook and arched into hills; rocks deeply buried began journeys that would lift them 30,000 feet. On the way, they bent, tipped and broke into huge blocks. When the earthquakes at last ended, those blocks formed ranges rising above the newly-made plains.

These mountains surround us here at Banff, their cliffs showing strata that were broken and distorted during the epochs of earthquakes. Crumpled limestones rise in the wedge-shaped peaks that frame the famous Bow View. They form the tip of mighty Cascade, while folded shales make walls along the road that climbs to the top of Stoney Squaw. Breaks, called "faults," cross dozens of slopes, cutting through hard beds already tilted and bent.

We see greater faults in canyons that reach the Bow Valley west of Banff. Some of them piled strata on edge; others squeezed rocks of the late Coal Age against formations 200,000,000 years older. Many ran obliquely through mountains, throwing gray and buff beds into zigzag patterns now exposed on pinnacles and cliffs.

We also trace the glaciers that came when cooling climate followed uplift. They deepened the great valley of the Bow, which cuts across a score of ranges before it at last reaches the plains. They broke huge blocks from narrow ridges, reducing them to rugged walls. They dug at the sides of massive mountains, leaving only the pointed peaks that alpinists call "horns." One of the finest of all horn peaks is Mount Assiniboine, two days' journey from Banff over spectacular trails.

Lake Louise fills a valley three thousand feet deep, dug in rocks that are gray, buff and brick red. As the glacial ice melted, it dropped piles of rock-rubbish or "moraines" that built terraces, dammed the valley, and turned it into a basin. As the glacier retreated still farther, its waters became the lake named for a princess—turquoise-tinted Lake Louise, Nature's mirror for lovely Mount Victoria.

THESE RED, GRAY AND BUFF PEAKS WERE CARVED FROM ONE GREAT BLOCK OF STONE BY THE ICE OF VANISHED GLACIERS

The Louise basin is completed by moraines, where hotel and tennis courts now stand. Lake Agnes, high above it, is different: its basin was dug from solid rock as a glacier pried out great blocks of quartzite and carried them to the valley below. "A tarn, we'd call it at home," says a Scot who has joined us on the trail. "Ye say geology calls it so, too? Then I'm glad to know such a high-flown science uses a few good Gaelic words!"

Rocks on the lake shore are coarse shoal sandstones that date from an early Cambrian epoch, 450,000,000 years ago. In them we can look for few good fossils—no corals, moss-animals, lamp shells or horn shells, all common in younger formations near Banff. Instead, we find burrows made by hungry worms, or pits where worm-shaped creatures called phoronids once built tube-like homes of glue and sand. To get even these we must bend over ledges, grub at loose blocks in talus, and scrape dirt from weathered slabs. Geology may be a "high-flown" science—but fossil hunting, as hobby or profession, keeps one very close to earth!

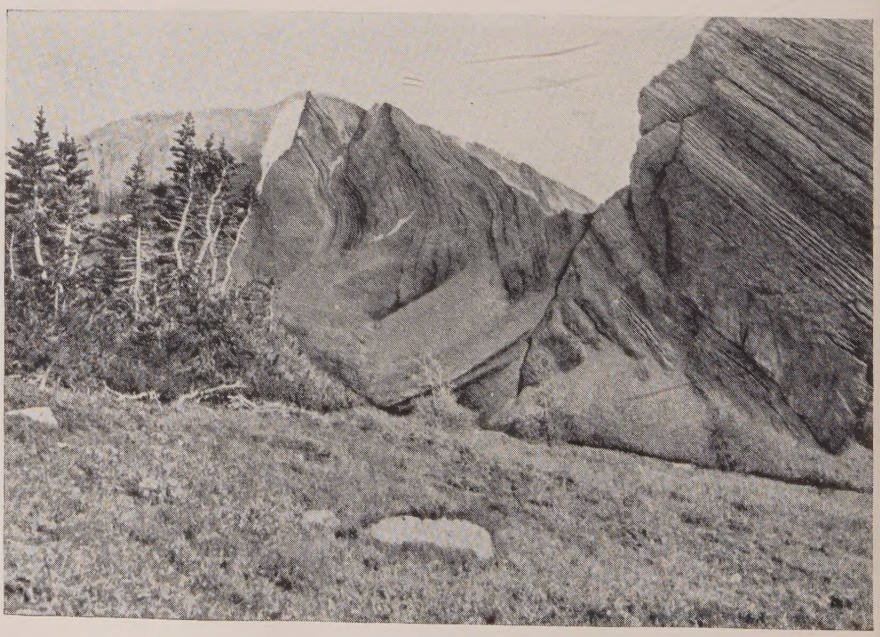
We lunch on ledges beside the trail that climbs to the Big Beehive. Pikas watch us nervously, call their warning *Skee! Skee!* and then go back to making hay for the winter that will begin in October. Marmots are less suspicious: they come up to beg peanuts, crusts and other tid-bits. Mantled ground squirrels are not content with donations. While we watch an eagle and two mountain goats, a squirrel seizes a piece of cheese and its mate makes way with a whole cookie. After that we concentrate on eating, lest we share too much of our meal.

One may reach the Valley of Ten Peaks by trail, but the trip is long and part of it is hard. Motor busses and cars require less effort, and the road they take gives a view unrivalled in the Rockies. Ten red, old-gold and buff mountains rise abruptly from a turquoise-green lake and are hung with glaciers that seem ready to (and do!) crash down in avalanches. They have richness, beauty of shade and form—and they tell us of the tremendous erosive power of the glaciers which, millions of years ago, carved them from one vast block of stone.

They also hint at the long ages through which Cambrian seas endured. There are 5000 feet of rocks in Mount Fay; if these settled at an average rate of one foot per century, they were forming during a half million years. Yet they represent but two Cambrian epochs, and by no means the whole of those!

Rocks high on Mount Babel contain fossil algae—remains of simple marine plants that filled their jelly-like colonies with lime as it settled from the sea water. At some times, their relatives grew very large; colonies in the Sawback Range are five to six feet high and three feet in diameter. Those of Mount Babel are egg-size or smaller—merely loose, flattened balls. Waves must have rolled them to and fro on the sea floor, which was a mixture of tiny lime grains and coarse sand.

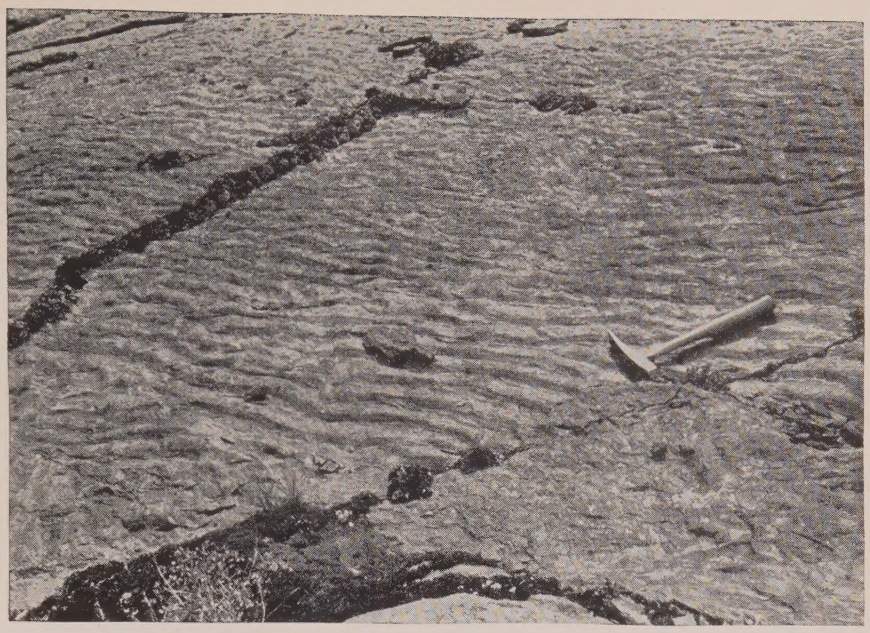
We find traces of currents in red strata exposed above



STRATA STEEPLY TIPPED AND BROKEN BY EARTH MOVEMENTS THAT BUILT THE ROCKIES

Lake O'Hara. The rocks themselves were laid bare by the ice of a glacier whose remnants still cling to the cliffs of the Continental Divide. Yet their story is one of a quiet bay whose waters, two to four feet deep, moved in gentle shore currents. Drifting, they piled mud and sand in "ripple marks," which were steep on only one side. This distinguishes them from wave-built marks, whose two sides always are equal.

On the trail back to camp we find odd markings that are "footsteps" made by trilobites. These jointed, flat-bodied cousins of the king crab were common in Cambrian seas. Some of them ate decaying rubbish, others dug wriggling worms from the sand, while a few lived on scum-like plants. All plowed furrows in the mud with their many legs; when sand filled those furrows and hardened into stone, it preserved the trails, though decay and solution soon destroyed the shells of the queer animals that made them.



CURRENTS OF LONG AGO MADE THESE RIPPLES ON RED STONE, UNCOVERED BY A RECENT GLACIER—

Other hikers join us on the trail across a low pass to Lake McArthur. We pause often to admire lichens and mosses, which are abundant in this valley. Then we cross alpine meadows rimmed with larches, where ptarmigans cluck among glacial boulders and hoary marmots sun themselves on blocks that once were parts of sandy shoals. We find channels carved and smoothed by the ice, and others dug by silt-laden streams that flowed beneath the vanished glaciers. Our companions discover some egg-shaped brown balls. They are fossil plants like those on Mount Babel, which frost and solution by rain water have broken from their coarse-grained rock.

Browsing moose welcome us to the Yoho Valley, scenic center of another national park. We meet them as we climb a hill in low gear, while the Yoho River foams below us. Our driver applies the brakes with a screech; the moose look around, wiggle their ears, and go back to their breakfast of fireweeds. Cameras click, whirr and buzz, and the motor coughs disgustedly as we once more tackle the grade. But the moose refuse to be concerned. Why interrupt a meal, just because a bus loaded with tourists comes along?

At Yoho Camp we leave our duffle and start up another trail. For a while it climbs steeply among spruce woods; the statistician of the party announces that we have traversed twenty-six switchbacks. The rest of us need our breath for climbing and our thoughts for the buff-and-gray strata lying beside the trail. Their mottlings, which are weathered into relief, seem to be fossils of branched algae much like those in modern "coral" reefs. Here they fill thick beds that stretch through ranges, telling us of great algal banks that once covered many square miles of sea floor 400,000,000 years ago.

We *cache* specimens near a ruined cabin and follow the slope of Michael Peak. Milky streams plunge down and across the trail, their waters colored by rock flour freed from melting glacial ice. Boulders bear surfaces polished and scratched when the ice scraped them against each

BUT NO ONE KNOWS WHAT MADE THE ROUND PITS FILLED BY THIS LAYER OF SANDSTONE

WE FIND PROOF THAT TRILOBITES CRAWLED AND DUG IN THE MUD OF AN ANCIENT SEA NEAR MODERN LAKE LOUISE

other; yellow arnica blossoms now nod beside them as they lie on the abandoned moraine. Slabs show more coralline algae, though of species different from those found beside the lower trail.

Takkakaw Falls roar steadily as we take the trail to Yoho Glacier. In a mile we come to a wide alluvial fan, its coarse rocks telling of the floods that follow the melting of snow in spring. We climb a half mile to reach footlogs and find a gorge where rocks have been tunneled by waters filled with coarse sediment. From it we turn to an open woodland where rivulets from the main stream have dropped so much mud that they now are higher than the mossy ground across which they flow. Using sticks for levels, we measure one mere trickle; its bottom has been built up four inches, while tiny levees beside it rise two inches higher still.

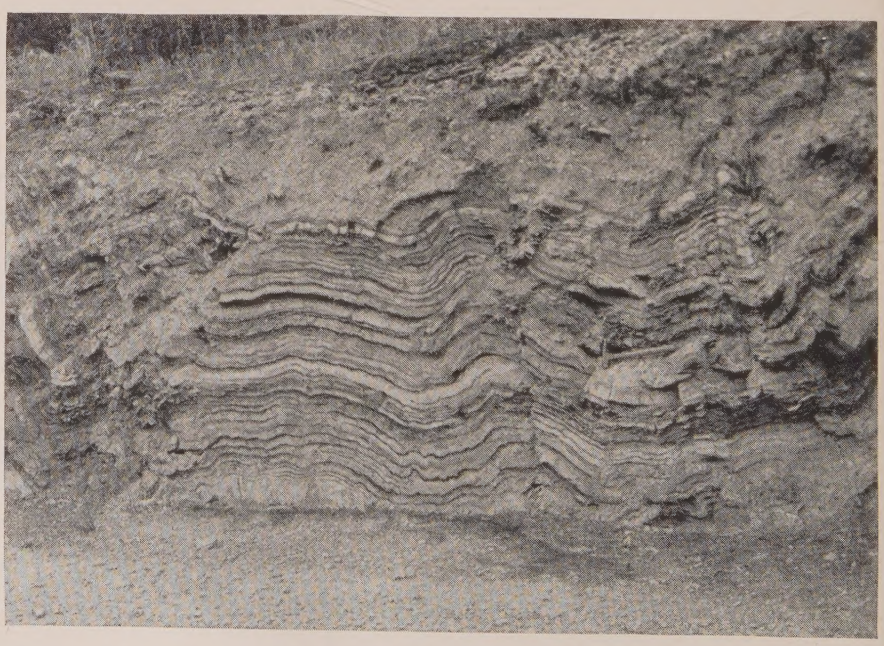
We walk to the edge of Yoho Glacier over rocks laid bare by melting of ice during the past five summers. They are smoothed, scratched, deeply scored and almost barren of moraine. Downstream are bare ridges left by earlier melting; they grade into slopes where stone-crop has found foothold, and from these into old moraines growing up to willows and seedlings of fir and spruce. In a hundred rods they show us the stages through which countless glacial valleys were transformed into meadows and forests after the last great Ice Age.

From the glacier we climb to the foot of Twin Falls, where a tea house with lodgings saves us the trouble of back-packing and making camp. The falls themselves lead from still other glaciers; their spray covers cliffs, boulders and trees with a grayish coat of rock flour. We choose a spot from which to photograph —and find that the spray spots our lens before we have time to make an exposure. No wonder that the nearby trees are dying under their coat of powdered stone!

Next morning we cross the creek leading to the waterfalls. Glaciers and horn peaks rise at our backs; below us the valley, a half mile deep, gives views of the mountains beyond Lake Louise. At our feet are carpet pinks, heather and rough-leaved dryas, whose buds are just preparing to burst. A mountain goat stands on a ledge, giving the last, most convincing touch to a scene that is wholly alpine.

Wholly? Not if we look at the rocks that rise in the mountain goat's bleak ridge. They plainly are ancient, hardened lime muds that settled beneath a sea. On a dozen beds are wave-made ripples, larger and even more nearly perfect than the current marks near Lake O'Hara. Dark streaks seem to mean olive-hued seaweeds that waved above the muddy flats where the trilobites crawled and burrowed and the lamp shells opened their mouths to currents bringing microscopic food.

Uplift, glaciers, marine shells, algae—all backed by amazing alpine views that stretch beyond well-built trails. Truly the present unlocks past ages for those who see as well as travel in the Rockies of Canada!



THIS SHALE WAS CRUMPLED BY UPLIFT THAT BUILT THE MOUNTAINS NORTH OF BANFF

More Than Mere Insects

Cicadas, ants, wasps and beetles glorified as soothsayers

By JOYCE M. JAEGER

WAR, want and woe can be seen in the wings of an insect, not by a Biblical prophet, nor by a graybeard seer of questionable reliability, but by any layman who examines closely the lightly-veined wings of a 17-year cicada, and recalls the stories related to him by his grandfather.

There, in deeper color near the margin of the coral-veined front wings, he can undoubtedly see a "W," and, if he possesses an unblinded faith in the teachings of age, he will read into it the warning that for hundreds of years has excited credulous and superstitious individuals.

WAR, WANT AND WOE?
To the superstitious, the appearance of the periodical cicada with the letter "W" outlined in the wings foretold disaster. They never turned it upside down, and believed money, mirth and merriment might be in the offing

The 17-year locust, more properly but less popularly known as the periodical cicada, actually is not among the close acquaintances of the average citizen. He could hardly be so, for only once in 17 years, or five times in a human lifetime, does an individual of the same brood regularly appear, to set tongues a-wagging with portents of misfortune. Then, without a note of warning, he and millions of his brethren burst forth from the earth where they have been metamorphosing for more than 16 years, swarm about the trees and shrubs, and fill the woodlands with their shrill, insistent song that is startling when first encountered.

C. D. Adams, Wisconsin State Department of Entomology, having witnessed a Kansas epidemic of periodical cicadas in the '80s, recalls vividly the odd noise they make.

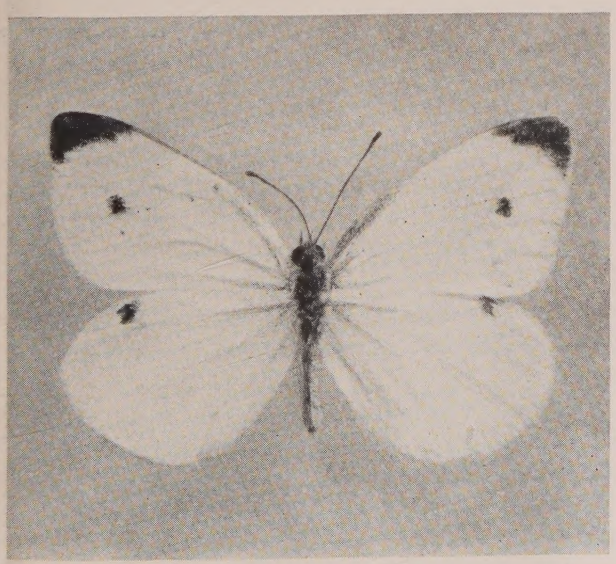
"We passed along a heavily-wooded road," he relates, "and heard millions of them singing and buzzing in the trees. I didn't know then what they were, and I asked my father.

" 'That's the 17-year locust,' he told me. 'It's been a long time since I've heard them.' "

More than anything else, the individual insect seems to sing, "Pharaoh, Pharaoh." The group song resembles the humming of a resonant telephone pole when its wires are vibrating in a strong breeze. The sudden and unexpected appearance of the cicada is largely responsible for the growth of the superstitions related to it.

"It was only natural," says Dr. Charles L. Fluke, professor of entomology, University of Wisconsin, "that when the cicada appeared suddenly in great numbers where there had been none before, superstitious and ignorant persons, seeing the 'W' on the wings, should say, 'War!' But lately, as popular education is spreading, that belief is dying out."

And with the dying out of the belief has come a lessening in numbers of the insect itself. In some places where it was once common enough to be a serious pest to fruit growers, it has, for the past brood or two, barely



FAMINE AND DESOLATION
Although no cabbage patch is too small to be overlooked by the white cabbage butterfly, the gullible believed its early appearance in the garden portended a general famine

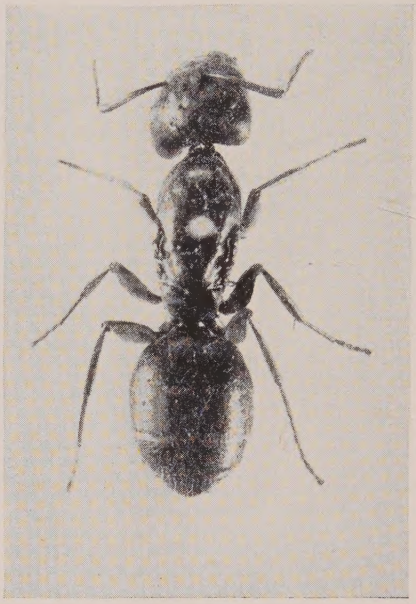
appeared—a happy omen to believers, who know now that, in spite of continued armament races, world peace is inevitably in view. But for hundreds of years, war or no war, the insects have in late May of every 17th year emerged to enjoy their few weeks of life above ground; and for hundreds of years, wars have been heedlessly fought with an unwholesome indifference to the habits of the 17-year cicada.

The majority of insects, however, are not credited with having such a significant influence on human destinies. Most of them, according to "those who know," are merely symbols of good or bad luck and affect our lives only superficially.

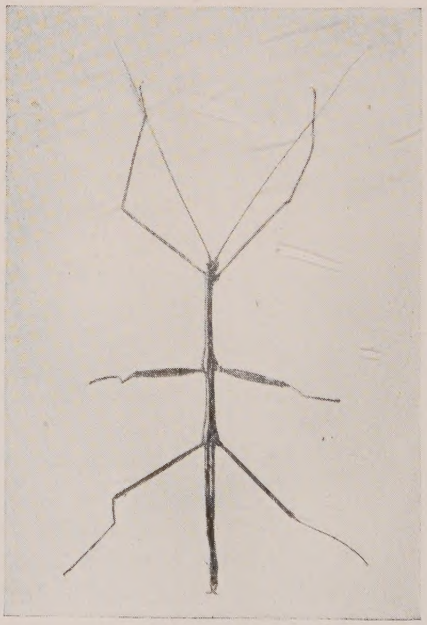
Has a fly persisted lately in flying about your face? A stranger wishes to meet you. Have you had a spider come down in front of your face or spin a web over your head, or have you seen a honey bee flying before you? You will receive a letter. Did a butterfly fly into your house? You will have a lady visitor who will be wearing a dress of the same color as its wings.

You must under no circumstances tear off the wings of a butterfly—that is very unlucky. The same butterfly left whole may bring you good luck by settling on your head, money by settling on the palm of your hand, a new suit or dress by settling on your shoulder, or a new sweetheart if he alights on your clothing.

A spider, too, to most people an insect, is a potent carrier of good luck if properly treated. Although, at various times, all black and all bright-colored spiders have been thought poisonous, it has long been known that you should "carry a dead spider (color unspecified) in your shoe for luck." To walk through a web or to have a spider crawl on you is the height of good fortune, and a bride receives a blessing in having a spider on her wedding gown. Killing the spider is extremely inexpedient for it reverses the consequences.



PROSPERITY AND THE DEVIL
According to the superstitious, great wealth follows a dream about ants—the more ants the better. But beware of the walking stick! It may be the devil himself come to life



The "cricket on the hearth" has been immortalized as the carrier of happiness and good fortune to the household in which it dwells. As a matter of fact, crickets are more likely to favor as an abode the dampness and protective seclusion of the bottom cellar stair to the hearth, especially as they like the potatoes that may be found in the cellar. But Dr. Fluke, after enjoying the benevolent presence of a solitary cricket under his basement stairs for years, moved into another home where there was no cricket, only to find that "I've been luckier than ever this year."

It may be well to forsake a house, leaving the cricket, but if a cricket forsakes your house, leaving you, it's a sure sign death will occur among your family. Sickness or dire calamity is also foretold by a moth singeing its wings in a candle flame.

The death-watch, a beetle that bores in the timbers of buildings, portends death with equal certainty, according to the legend. In boring, the little insect makes a ticking sound by striking its jaws or head against the walls of its burrow—a soft but persistent tick that can be heard only in the dead still of night, at which time the only persons awake and eligible to hear are watchers at sick-beds. These circumstances facilitate belief in the gruesome legend.

If coincidence strengthens that superstition, it is a short step to believe that a white moth hovering about at night is the spirit of the dead relative or friend. If the death has occurred in a family that keeps bees, haste must be made to inform the bees of it, or they will all leave.

Not only the lives of human beings, but also the welfare of their cattle and crops has been attributed arbitrarily to insects and their kin. To kill a "daddy-long-legs" is to court disaster. Your harvest will be poor, and you'll lose all your cows, or your cows will go dry. But if you hold the creature by two legs, he will point with the others where the cows are, and if you throw over your shoulder one that has crawled on you, good luck is yours. A poor crop is foretold too by a white cabbage butterfly flying in the garden early in the season.

German housewives once called a moth a "butterhex." Because of night flying habits, moths were identified with witches, and bewitched (hexed) butter by crawling into churns, milk pans, and butter jars. A more modern belief is that small moths called "millers", other than the clothes moth, cause injury to clothing and fabrics.

Regarded with horror were walking sticks, relatives of the grasshopper. They were thought to be sticks come to life. Children have more frequently feared damselflies, or "darning needles," which reputedly are evil spirits sent by Satan to work mischief, and which sew up chil-

THE DEVIL'S DARNING NEEDLE

This harmless insect, the damsel-fly, has been accused of sewing up the ears of bad boys. To some it is known as the snake doctor, supposedly administering to the needs of the reptiles

dren's ears. To earwigs, insects that sometimes become serious pests around the house, is also attributed the habit of creeping into the ears of sleeping persons and sewing them up.

A favorite with children is the lady-bug, or lady-bird, a common beetle. They know it is bad luck to kill a lady-bug, and good luck to have one in the house in winter, or to have one crawl on their hands. Tossing it into the air, they chant:

"Lady-bug, Lady-bug,
Fly away home.
Your house is on fire,
Your children will roam."

It is just as definitely known that fireflies seen after dark are "fairies hurrying to a dance," and that if a dragonfly sits on your fishpole or line while you are fishing, you might as well go to school for the fish will not bite.

A sure sign of the coming of cold weather is a butterfly seen in the late fall, and 90 days after the first katydid there will be a frost. Warm weather, on the other hand, is promised by noisy locusts; and rain, by the biting of flies.

An easy short-cut to prosperity is to dream about ants, or to carry a spider in your pocketbook. You will lose your "pot of gold" however, if you disturb yellow butterflies settled in a puddle.

The nests of wasps can be useful both to old people and young. If a girl wants her sweetheart to love her more, she need only wear a piece of a wasp's nest in her clothing. Some old people find that the paper from such a nest makes the best possible wiper for spectacles. A housewife is careful not to knock down or remove the nest of a "mud-dauber," for such an act presages the breaking of all her dishes.

Even the well-informed housewife, realizing the difficulty of getting rid of flies, also knows that "kill a fly and ten flies will come to its funeral." She may believe that bedbugs are carried into the house by bats, or that to get cockroaches to leave a building she need only impale one on a pin. It is certain that her equally well-informed husband will believe that his dog must have a flea or two to be really active in his master's interest. If he keeps bees, he knows that he must not count his hives or all the bees will die.

Those undoubtedly lead a precarious existence who must consider the reaction of the insect world to their every movement. The same persons, being believers, find the medicinal uses of insects highly beneficial and economical.

Dusty cobwebs, the superstitious say, have been used to stop the flow of blood from a cut, and pills made of cobwebs, to stop hemorrhages. Headaches have been cured by swallowing a bit of a spider web. The clay from the nest of a wasp is reputedly excellent as a cure for boils. There is nothing like a bee sting to cure rheumatism, in the opinion of many who have never been stung or had rheumatism. To remove warts, the bite of a katydid or cricket is effective. Cockroaches, crickets, and earwigs, variously bruised, burned, or boiled, and properly compounded and applied, so tradition recalls, will cure earache, dropsy, ulcers, and weak sight, thereby doing as well as or better than concoctions offered by barkers in medicine shows of a decade or two ago.

Perhaps the most strangely prepared and all-encompassing cure is "specific medicine Apis." This preparation is extracted from the bodies of honey bees by killing them in alcohol while they are intensely excited. The bodies are digested in this medium at a warm temperature for a month, until the final strength represents two ounces of bees to one pint of medicine. That hives, diphtheria, scarlet fever, dropsy, erysipelas, and all kinds of œdema accompanied by swelling and burning could be cured by "specific medicine Apis," was the belief of our forefathers.

And so, in medicine as well as in mythology and legend, insects have their place—and a large place it is, for there are more species of insects than there are of all other living forms, including plants. The legitimacy of this place might be questioned by skeptics, but, skeptic or believer, it is probably best to play safe and not tempt fate—or the insects.

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We asked Diana Thorne what she thought about doing a dog story for us each month, together with some of her inimitable drawings. She said she thought it would be fun. We know it will be delightful. So Miss Thorne starts having fun and, you, enjoyment, in this issue on page 254.

Choosing and Using Your Binoculars

By ELSA W. REICHERT

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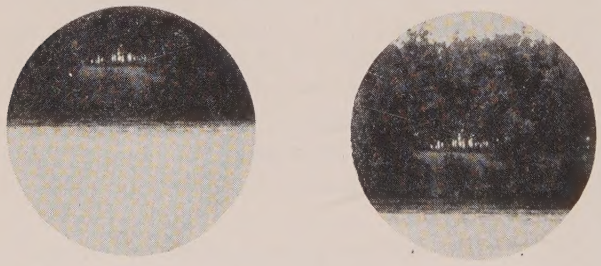
We receive frequent requests from readers for advice in selecting an all-purpose binocular for Nature and general outdoor use. Some of these letters ask somewhat technical questions about power, light and such. The selection of a binocular is important. A cheap pair is nothing more than a cheap pair. Binoculars are precision instruments. As a means to answer the unvoiced questions of many who have hesitated to inquire about binoculars, we have asked Mrs. Reichert, of the Mirakel Optical Co., to give us some of the essential facts. She does this in the accompanying article.

WITH AND WITHOUT BINOCULARS

The little image in the corner shows the above poster, as seen at a distance with the naked eye. The larger picture is what one would see at the same distance through 8X (8 power) binoculars. Without binoculars not even the large type can be read; through 8X binoculars the small type is legible

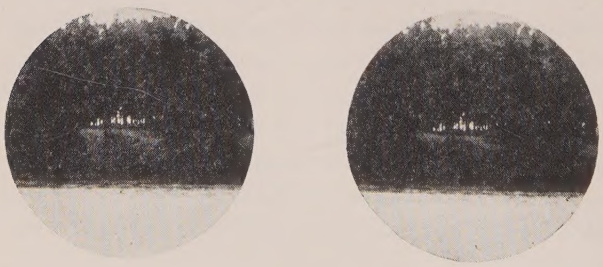
YOUR eyes, with a little assistance, can perform a miracle. They can take you across the lake to the grazing deer, to the bird perched on the tall pine, or to the migrating wild-fowl high overhead. A pair of suitable binoculars—and the intimate secrets of birds and beasts are yours. The "most suitable" glass is the one which will best suit you and your kind of work.

For observing at short distances, an ordinary field glass, having a magnification of from two to four times, will serve fairly well. This type of glass is called a "Galilean" glass, after Galileo, who, in 1609, invented the telescope. In fact, it has changed little in essential design since that date, except that the modern Galilean glass consists of two tubes, being indeed a double telescope. For those whose eyes are not in good condition this is the strongest glass that can safely be used with comfort to the user.



CONTRAST IN ADJUSTMENT

Above is what we see through binoculars out of alignment, below they are properly aligned



For more distant observation, greater magnification is desirable. In a Galilean glass magnifications of more than four times necessitate such long tubes that a small field of view and bulky size result. The prism inversion system makes high magnification possible, together with wide field of view and moderate size. This system was invented by Porro in 1851. It was not until 1893, however, that the optical glass industry developed sufficiently for quantity manufacture of prisms to become practical. In that year the prism binocular was introduced to the public by Abbe, and has ever since been the popular instrument for long range observation.

Deciding what magnification you should use is simple when you bear in mind what magnification means: If you view a poster through an 8X (8 power) binocular, the bottom line appears eight times longer and the side eight times higher than with the unaided eye. The total area, therefore, appears *64 times larger*. Or, to put it differently, the poster appears only one-eighth the distance away.

When observing objects as small as birds, it would seem desirable to bring them even closer than one-eighth the distance—the closer the better, one might think. However, very high magnification offers several serious disadvantages. First, considerably less light reaches the eyes. A 12X binocular, for example, transmits only one-fourth as much light to the eyes as a 6X of the same construction and same size objective lenses. Although the bird will appear much larger, it may, unless the light is extremely brilliant, appear so dim that details of color and line will appear less distinct than through the lower power instru-

THE SAME SCENE IN BIRDLAND THROUGH BINOCULARS OF DIFFERENT POWERS

At the left is a flock of geese brought closer through a 6X binocular. At the right a 12X binocular brings two birds closer, but leaves the rest outside the field of vision

ment. Thus, in some cases, the advantage of added size is lost.

Furthermore, the field of view (angle of vision) is much smaller through a 12X than through a 6X binocular. Through a 12X binocular you see only one-fourth as much of the scenery as through a 6X glass of similar construction. This may mean that you see only one or two birds of a flock, instead of four times that number. It also makes it more difficult to locate a bird, especially when in flight; and if you do succeed in spotting him before he flies out of range, you will find it hard to keep him within so limited a field of vision.

But the greatest disadvantage of very high power is the unsteadiness of the image. The higher the power, the more every slight vibration of your hand is magnified, causing "jumpiness" of the image. Few of us, however steady our hands, can use more than 8X with comfort. And if there is anyone to whom restful vision is important, it is the bird lover, who uses his binoculars almost continuously while in the field. However, some ornithologists use a 12X to 16X binocular mounted on a tripod for observing from a blind, but never more than 8X for general use.

Other specifications to be considered when selecting a prism binocular are field of view and illumination. You can gauge the field of your binocular, at least approximately, by comparing it with another glass whose field you know. The width of the field depends on various complicated factors in the internal construction of the binocular, and not, as some believe, on the size of the objective lenses (those farthest from the eyes). This is apparent to the photographer, who by closing the camera's diaphragm (reducing the size of the lens opening), decreases the amount of light entering the lens without affecting the angle of vision.

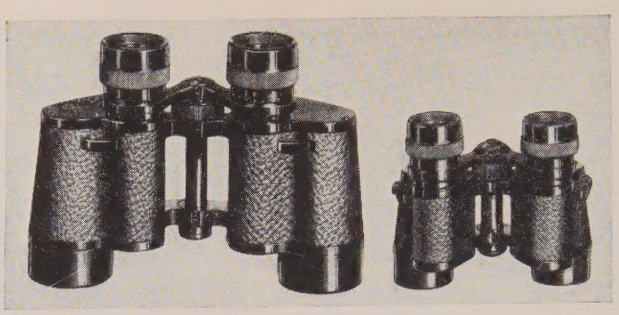
That this is also true with binoculars is easily demonstrated. In front of the left objective lens hold a card through which you have punched a hole with a pencil. The lens opening has been reduced to the small pencil hole—but the field of view remains the same. The illumination (amount of light that reaches the eye) is now so small that the view seen through that side of the binocular will appear dim and therefore indistinct. To compare the amount of light entering the two sides, hold the binocular about ten or twelve inches from your eyes, and pointing towards the bright sky. In the left ocular (eye) lens you will see a tiny spot of bright light, probably irregular in shape, due to the jagged edge of the pencil hole. In the right ocular lens you will see a larger and perfectly circular spot of light.

This circle of light—the image of the objective opening in the ocular lens—is known as the "exit pupil". In an 8X34 binocular (the diameter of the objective lens being 34 millimeters), the diameter of the exit pupil is 4.25 mm.; in an 8X24 binocular it is 3mm. The square of the diameter of the exit pupil is the figure listed in catalogs as "illumination" or "light transmitting power". However, although this is the only figure commonly mentioned in catalogs, it does not by any means tell the whole story regarding the amount of light that reaches the eyes.

In the ideal binocular, which we all desire but which does not yet exist, all the light entering the objective lenses would reach the eyes. Unfortunately, however, prisms and lenses absorb light; and the thicker these are the more light is absorbed. In the so-called "high illumination" binocular, where the objective lenses are large, and therefore thick, and where the prisms must be correspondingly large, only about forty percent of the light entering the objective lenses reaches the eyes. In smaller instruments, such as pocket size binoculars, about fifty-five percent of the light gets through, which accounts for the surprising "brightness" of well-designed pocket binoculars, despite the relatively small objective lenses.

"A glass in the pocket is worth two at home" is the slogan of many a bird lover, for the finest binocular is of

little use if left at home because of its weight. Manufacturers, realizing this, have recently introduced full size binoculars made of extremely light metal, thus making possible both high illumination and light weight. Besides light weight, the pocket binocular offers the added convenience of small size.



TWO DIFFERENT SIZES IN BINOCULARS
Showing relative size of an 8x34 high illumination binocular (left) and an 8x24 pocket size binocular (right)

When choosing a binocular, consider not only the specifications but also the quality, especially the clarity of vision. To design a binocular with clear vision over the entire field requires months of intricate mathematical calculations. The polishing of the ten (or more) lenses and four prisms—a total of at least 32 surfaces—must be extremely accurate; and the optical glass must conform exactly to the specifications. Slight inaccuracy in any of these respects means indistinct vision; sometimes on one side only, as not infrequently happens in low grade binoculars. Such defective visibility and the resulting eye-strain can easily be avoided.

When you adjust your binocular to your eyes with proper care, you automatically test its clarity. Be sure to select a distant *printed sign* on which to focus (buildings or trees appear satisfactory even when slightly out of focus, but print is readable only when clear). Then rest your elbows on some stationary object to ensure steadiness, and adjust as follows, according to the type of binocular.

A. *Binoculars with central focusing wheel.*—Close your right eye, or, better still, hold a card in front of that side of the binocular, and turn the central focusing wheel until you see clearly with your left eye. Then shut off the vision on the left side, and turn the right *eye-cap* (do not touch the central focusing wheel) until you see clearly with the right eye. Having adjusted for each eye separately, you should see equally clearly with either, no matter how your eyes may differ. Then bend the binocular at the hinge, until the two circles fuse into one. Note the reading of the right eye-cap, so that, if it becomes shifted, you can set it back. With this cap in correct position, you can adjust the binocular simply by looking through it with both eyes and turning the central focusing wheel.

B. *Binoculars with separate eye-cap adjustments.*—Shut off the vision on the right side, and look through the left side only, turning that eye-cap until you see properly. Proceed the same on the right side, and bend the hinge to fuse the two circles. Take the reading of each eye-cap. If the caps become shifted, you can set them back without looking through the binocular. It pays to be very accurate the first time.

If each side of the binocular gives you clear vision when looked through separately, you should see clearly and restfully when you look through both. If, however, you have a feeling of eye-strain, or difficulty in looking through both sides at the same time, it is certain that your binocular is not functioning properly. It is out of alignment. Instead of the two optical axes being parallel, they point in different directions.

When this is appreciable, you will see better with one eye than with both, and there will be no doubt about the binocular being unfit for use. With binoculars only slightly out of alignment the trouble may not be so obvious. Your eyes have a remarkable ability to accommodate, and by exerting considerable muscular effort you may be able to force two slightly different images to fuse. Probably the images will appear to "flicker", as your muscles struggle to make them merge. Your eyes will feel as though they "are being pulled out of your head" due to this unnatural strain on your eye muscles. For restful vision the alignment must be perfect. And restful vision is vital in bird work, where binoculars are used frequently and often for long periods at a time.

The hard wear that a Nature lover gives his binoculars makes good materials and workmanship doubly important. Besides clear vision when new, you will want equally accurate service after years of continuous use. And should accidents occur and repairs and replacement of parts become necessary, you naturally want such parts readily available. When purchasing an imported binocular, it is wise to choose a brand whose importer takes the trouble to stock a full line of parts.

Should your binocular require cleaning, re-aligning, or other repairs, do not attempt to do this yourself. Few realize that a prism binocular is a scientific instrument having seventy to one hundred parts, many of which require exceedingly accurate adjustment. Scientific instruments should be serviced by an expert; in the case of binoculars by one equipped with an instrument known as a collimator to ensure perfect aligning work.

A good binocular is indispensable on any field trip. It enables your eyes to leap the distance separating you from bird or beast, and reveals details you would not miss for worlds—in fact, it opens new worlds to you. Fascinating revelations of wildlife are yours if you have a good binocular with you in the field. It need not be too costly. Consider the original source of supply, which should be indicated by a company brand engraved on the instrument. The good reputation of this brand is your best guarantee of excellent and accurate service over a long period of time. It does not pay to gamble on a binocular.

If, after reading this helpful binocular article, we may be of further help to you in choosing the right glass for the job, please feel free to call upon us.

A SHORT STORY of the SWEET PEA

By LOIS TORRANCE

Photographs courtesy W. A. Burpee Co.

THE NAME sweet pea suggests the warm moist atmosphere of a florist shop, visions of a fluffy mass of soft blending colors or a sweet fragrance that stimulates imagination. It may recall the nursery where you were first introduced to their dainty flowers by the story of the Sunbonnet Babies, or the first corsage you received on a celebrated day.

The sweet pea has been known for a comparatively short time, but has gained such prominence as to become the second best seller, next to the rose, in the florist trade. However, by no means has it always been so greatly admired. The first sweet pea known was a small lavender blue flower growing in Sicily. It attracted the attention of an observing monk, Franciscus Cupani, with its fragrance. He collected seed and sent some to Holland and England in 1699. Eight years later, in 1707, two more colors were found in Ceylon, a white bicolor and a red. It is more than likely that these grew from seed taken by merchants from Sicily to Ceylon. These flowers were not much larger than those of the vegetable pea and attracted but little interest.

Sweet peas have been listed in catalogs by English seedsmen since 1730, but by the end of the Eighteenth Century, only five colors were known—purple, dark maroon, red, white, pink and the white bicolor that was later named Painted Lady, a species famous in sweet pea history, from which another well-known variety, Blanche Ferry, developed. It was not until late in the Nineteenth Century that hybridists realized the possibilities of sweet peas. In the meantime another monk, Mendel, was working in his garden with these very flowers and observing laws that gave a basis to all plant breeding of today.

A NEW PRIZE-WINNER

The new "Bonnie Ruffles," a large, long-stemmed variety, developed by the Burpee Company on their California farms, won flower show prizes both here and in Great Britain. The beauty of the flowers, when gracefully arranged in a vase, is shown below

The carnation and the rose then occupied the attention of most gardeners, but not that of Henry Eckford, who in 1876 began his revolutionary work with sweet peas. He carefully selected the best types, and improved their color and form until these humble flowers had created so much interest that, in 1900, a National Sweet Pea Society was founded. The remarkable thing about Eckford's work was that in spite of the hybridizing the flowers still retained their fragrance. The unusual possibilities of the sweet pea are easily realized when one learns that at the time of Eckford's death in 1905 there were more than 300 varieties.

The reason for the sudden popularity of sweet peas was probably the appearance of a large waved type in 1901. There is some controversy as to the originator of this type. Credit is given to Silas Cole, gardener for the Countess Spencer, after whom the type is named, and also to a Mr. Viner. Both of the waved sweet peas that these men discovered were developed from the same variety, Prima Donna, which they had received from Mr. Eckford. Viner later sold his stock of seed back to Eckford. The name of another seed grower is involved with this story, that of W. J. Unwin, who also observed the waved type and called it Gladys Unwin. The

SWEET PEA CULTURE ON A LARGE SCALE

The sweet pea seeds of the large seed companies are grown in rows under key numbers. The orange variety, susceptible to sun-fading, is covered by screens, but part of these rows are left unprotected so that the effect of the sun's rays may be studied. Photograph taken at Burpee's Floradale Farms, Lompoc, California

appearance of the Spencer type was all that was needed to skyrocket the sweet pea to its pedestal of popularity. In England the growing of sweet peas developed to such a craze that in a sweet pea show in 1911 a prize of $5500 was offered.

All the interest was not centered in England. The seed growers in America had also been working with this flower. Englishmen were sending their seed to California to be grown where the climate was most favorable. The American seed firms, among whom the names of W. Atlee Burpee Company, Anton Zvolanek, and C. C. Morse and Company are familiar, had been working to produce different varieties. They had introduced dwarf Cupid sweet peas and double ones, but neither proved very popular. In his 1896 catalog, Mr. Burpee states, concerning double sweet peas, "we must confess that we do not consider them so beautiful as the large expanded single flowers. It was not our intention to offer double sweet peas until they had become more thoroughly established."

These growers had still another goal in mind. Many people have probably noticed with regret that their own sweet pea vines begin to fade in the summer before they have borne many flowers. In short, the climate of a great part of the United States is too hot for some sweet peas and the vines are killed before they have had a chance to mature. The growers set to work to suit the sweet peas to the climate. Their aim was to develop an early flowering variety that would increase the florists' crop and could be grown in the southern states.

The story of the development of the early flowering sweet pea is long but interesting, involving many people, including in particular Anton Zvolanek, who conceived the idea of crossing sweet peas with a common vetch that blooms early in the summer. He claims that crosses were made in Vienna and when he came to America in 1888 he brought seeds of these hybrids, which he crossed with the Grandiflora type. Gradually, by careful selection, he developed several varieties of his early flowering type, differing in growth from the original Grandiflora in that the plant has only one main stem. As soon as the Spencer type was found, he crossed this with his earlies. He worked in secrecy and therefore a second climax in the history of sweet peas took the horticultural world by storm when in 1910 he opened his greenhouse for inspection. The first twelve named winter orchid-flowering sweet peas, as Zvolanek called them, were introduced in 1913. It is the flowers of later developments with this type that are observed and admired at the early spring flower shows.

The most recent addition in the sweet pea world is the ruffled type created by Burpee who has been working to fix this type since 1896. It is the double sweet pea promised by Mr. Burpee in the 1896 catalog. The flower has a double, and sometimes a triple, standard which now is an added attraction because of its much ruffled quality. These sweet peas have very wisely not been called double, for they would have little chance for recognition with a background of being considered not as beautiful as the single type. They are known as the ruffled type and as such have received worthy attention. Since 1927 the ruffled type has been offered by Burpee, and each year new colors have been added to the list. The attractive Bonnie Ruffles, which received the gold medal at the Scottish National Sweet Pea Society in 1936, and the ruffled Burpee Blue, given an award of merit by the National Sweet Pea Society of Great Britain the same year, are two of their prize-winning introductions in the giant ruffled type. (Continued on page 252)

Caracara: the Prairie Dweller

By HUGO H. SCHRODER

CARACARAS ON THE WING

The camera has caught this pair as they soared over the Kissimmee prairie, Florida, wings and tails fully spread. To the ornithologist this picture presents an interesting study in avian aeronautics. All photographs by the author

IN THE year 1831, John J. Audubon, well-known American ornithologist and painter of bird life, made a trip to Florida. Shortly after his arrival at St. Augustine in the latter part of November, he encountered a large hawk-like bird with which he was not familiar. His efforts to obtain a specimen were unsuccessful until several days later. This bird was described by him in his work on American birds under the name *Polyborus vulgaris*. More than thirty years after Audubon found the bird, John Cassin, after studying the Florida race gave it a specific name in honor of the great ornithologist.

Today this bird is found in a rather restricted area in central and southern Florida, where it lives in the open prairie regions. How the caracara came to Florida originally is somewhat of a mystery, for the normal range of this bird, as was discovered after Audubon's find, is in Texas, Arizona, Mexico and Central America. It is quite likely that severe storms carried some of the caracaras from Mexico or Texas across the Gulf of Mexico to Florida, where the birds found the country to their liking. Food was plentiful and there were few enemies, so the birds prospered until the arrival of settlers. The small area in Florida is the only region in the eastern United States where the caracara is found. Hundreds of miles separate the Florida birds from those in the southwestern United States and Mexico.

My experience with Audubon's caracara is limited to the birds I have observed on the Florida prairies. Here they usually build their nests in the tops of the cabbage palmettoes from fifteen to fifty feet above the ground. The nest is a rather bulky structure, made of vines, weed stalks and various other material. During the winter and early spring months, two or three beautifully marked eggs are laid. Caracaras do not range very far from their home site, and when disturbed at their nest, usually remain nearby. Wanton bird killers could slaughter these birds, because they usually remain within gunshot when their haunts are invaded during the breeding season.

Both live food and carrion is eaten by the caracaras. I have seen them sharing dead carcasses with the turkey and black vultures. They capture various kinds of live prey, including turtles, snakes, frogs, lizards, crabs, crawfish, rats, rabbits and insects. A small species of turtle is one of their favorite foods, and empty turtle shells are frequently found on the ground near the nest of the caracara.

On one occasion I found a caracara devouring a turtle on the ground. The bird was reluctant to leave its feast of fresh turtle meat but when I approached with my camera it rose a few feet from the ground and dropped back to earth about twenty feet beyond. As I continued to stalk the bird, this procedure was repeated several times and I succeeded in securing several camera shots of the bird at rest and in flight.

The voice of the caracara is harsh and unmusical. It might be likened to the noise made by a wooden rattle. Last year I was accompanied by a fellow wildlife photographer on a trip to the caracara's range in central Florida. We discovered a nest in a cabbage palmetto. When my companion investigated this nest, he found that it contained two small young birds. While my companion was at the nest, I had an opportunity to secure a number of action photos of the caracaras in flight. In one shot, I succeeded in getting both birds of the pair on my film. The fully extended wings with the widely separated slotted wing feathers is clearly shown. The tail is spread like a fan, outlining the rounded ends of the tail feathers and depicting the contrasting patterns of light and dark on the under side of the tail.

My companion neglected to take his camera when

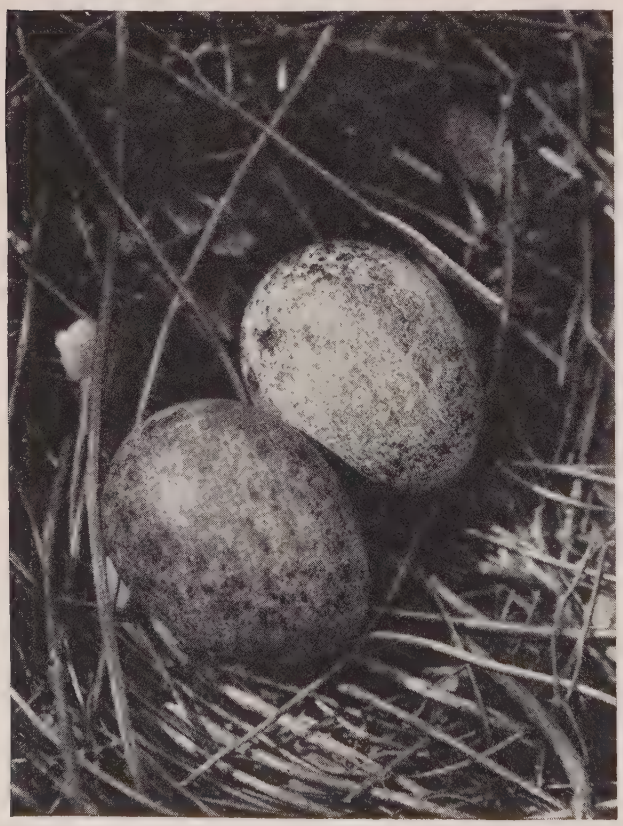
UNAFRAID OF MAN

A homelover, Audubon's caracara remains close to its nest at all times and refuses to be disturbed by Nature photographers

climbing to the home of the caracaras. Had he done so, he could have secured a number of action shots at close range, for the birds made repeated flights in his direction, although no effort was made to strike at him.

Although the greater number of Florida caracara nests are in palm trees, where photographing is almost impossible, I have found a few nests in oak trees. At a nest built in the top of a low oak, I was able to secure a photographic record of the eggs in the nest, by balancing myself among the smaller branches near the bulky structure. I could not get far enough above the nest to show it in its entirety and had to be contented with a picture of the eggs and part of the nest. The two eggs were decidedly different in coloring and markings; one was covered with large blotches of deep brown, while the other had much smaller markings and was much lighter in color.

Some weeks later, when I returned to this caracara home in the oak, I found a single fuzzy youngster blinking at the strange visitor to his nursery. The nest site was nearly one hundred miles from my home, and this prevented me from photographing the young bird at different periods of growth. On my last visit to this nest, it was my good fortune to find that the young caracara was fully grown. When I climbed to the nest with my camera, the youngster clambered overboard, edging to the end of the small branch. Just after the thud of the focal plane shutter on the last exposure, he sailed from the tree and landed on the ground near a dense growth of saw palmettoes. When I reached the ground, I found no trace of the bird. He had found shelter among the palmettoes, safe from the big black box of the wildlife photographer.



Although the first Florida record of Audubon's caracara was at St. Augustine, it has since disappeared from that vicinity, and from all the northern portion of its former Florida range. Today most of those remaining are found in the prairie regions, north and west of Lake Okeechobee, with a few in other parts of the state.

NEST AND EGGS OF THE CARACARA

Caracara eggs have a light background, spotted with various shades of brown. In this instance one was covered with large dark blotches; the smaller egg differs from its nest mate more than usual

THE BEE

By ELEANOR ALLETTA CHAFFEE

Gold on his leggings and velvet suit,
Gold on his vest from his latest loot:
This is the rogue with a sword tucked under
His coat, and a voice of delicate thunder.

You'll find him headfirst in a rose
Almost any day; and where he goes
The flowers crinkle their tiny faces
To see his peculiar airs and graces!

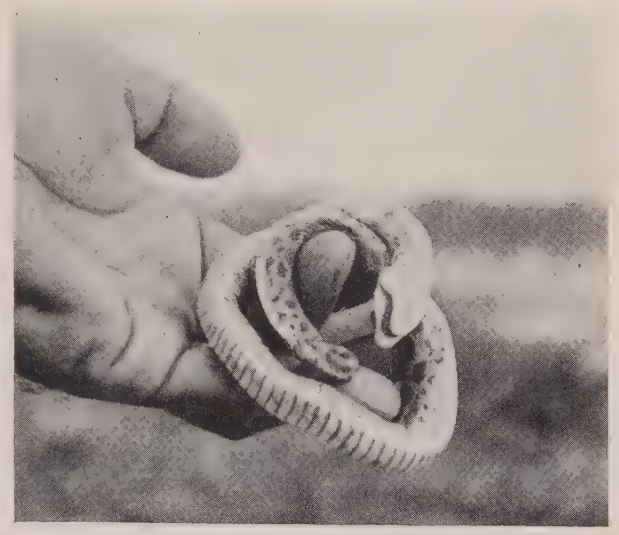
Snakes That "Play Possum"

By GUY VAN DUYN

SO WELL KNOWN is the opossum's trick of feigning death as a means of escaping from enemies that the meaning of that distinctively American expression, "playing possum", is perhaps as widely understood as any idiom in our language.

Yet, our common marsupial has by no means a monopoly on this quaint subterfuge, for we have certain snakes that resort to the same practise under similar circumstances. Moreover, in my own experience at least, these snakes actually appear to be more consistent in the matter than the opossum. Certainly, not a few of the roving opossums that I have laid hold of by the tail—which member, as everyone knows, is this animal's proper handle—not only disregarded the part they were supposed to play but even stepped so far out of character as to register strenuous protest in the form of angry growls and free use of unpleasantly sharp teeth. On the other hand, I have yet to encounter a hog-nosed snake that could not be prevailed upon to do the dead-snake act. In the face of such evidence, it would perhaps be stating the case more accurately to say that the possum "plays hog-nose" rather than vice versa.

The hog-nosed snakes, genus *Heterodon,* are among the most interesting of the common harmless snakes of the United States. Four species are recognized; the common, *H. contortrix,* the southern, *H. simus,* the western, *H. nasicus,* and the Florida hog-nosed snake, *H. browni.* Comparatively few people, however, now know them by any name, for the sinister aspect and seemingly vicious nature of these innocent reptiles have not only brought about their wanton destruction wherever they are found, but also have given rise to such fearsome appellations as spreading adder, puff adder, spotted adder, blowing viper and sand viper.



DEAD AS A DOOR-NAIL; OR IS HE?

The hog-nose is quite a bluffer. If his ominous hissing doesn't disturb you he will strike, neglecting, however, to open his mouth! If you are still not frightened he rolls over and plays dead

Though differing considerably in size, color and markings, all four species have a number of distinguishing characteristics in common. All feature the more or less turned-up snout from which their popular name is derived; in the western and southern species this peculiar adaptation of the rostral plate is developed to a marked degree and is put to good use in burrowing.

The generic name *Heterodon* denotes another feature common to all its members, the word being compounded from the Greek *heteros* (other, different) and *odous* (tooth), referring to long teeth situated behind and apart from the regular array of small teeth. This specialized dental equipment serves the highly useful purpose of puncturing toads, that, during the engulfing process, frequently resort to inflation in an attempt to save their lives. Another feature of this genus is the mobility of the elongated cervical ribs that may be spread at will, thus widening the neck in the same manner that the familiar cobra's hood is spread, though to a less spectacular degree. The ribs, incidentally, are also used effectively in the more leisurely phases of locomotion, progress by means of the familiar lateral undulations being reserved for more urgent occasions. The tail, too, appears weak and insignificant but is surprisingly prehensile for a snake of terrestrial habits.

Three of the species, the common, southern and Florida hog-nosed snakes, are found in Florida, the last named being confined to the southernmost part.

THE DOOR-NAIL ACT WITH EMBELLISHMENTS

This one thinks a little horror adds a touch of realism to his alleged demise. He writhes in apparent agony, mouth agape, but rights himself and slinks away when he believes you are not watching him

The southern hog-nose, *H. simus,* is the smallest, attaining a length of only about twenty inches. It appears to be the one most frequently found and is also the species with which the writer is most familiar from personal observations. Its ground color is a warm, sandy gray with dark brown ovoid spots somewhat irregularly arranged along back and sides. On top of the head is a U-shaped mark of the same color, its prongs directed backward down the neck, while across the "forehead" another such mark extends backward through the eyes.

Encountered in the dry, sandy areas he loves to roam, the little fellow is easily overtaken and, once he realizes the futility of flight, will permit you to witness a remarkable display of acting ability. His head promptly assumes a villainous aspect, spreading until its breadth at the base of the jaws equals or exceeds its length; the neck swells to equally sinister proportions.

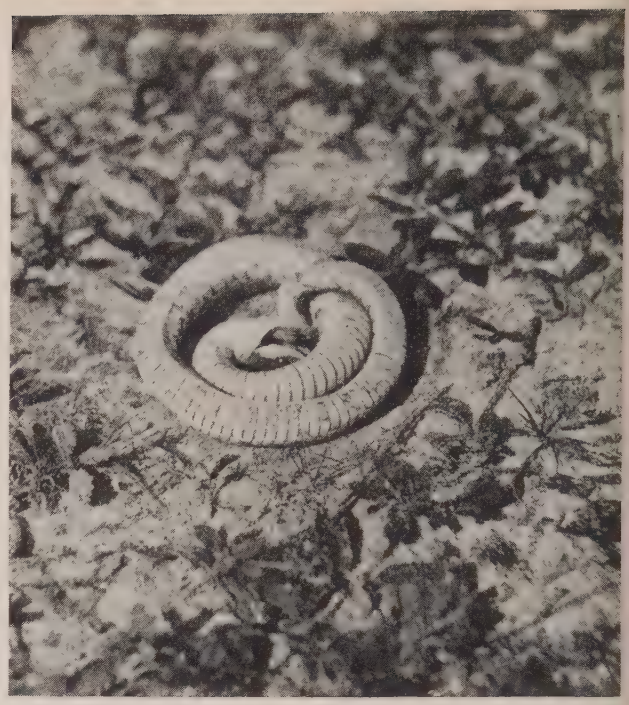
The touch, or sometimes the mere approach, of a hand induces a vicious looking "strike", accompanied by an explosive hiss. Little wonder that faint-hearted southern negroes will tell you the cemeteries are full of the victims of this awe-inspiring little bluffer, for it takes a close observer, and an open-minded one, to note that, in striking, the snake neglected to open its mouth. Personally, I have never succeeded in inducing one to bite and I doubt that anyone else has. He may "strike" repeatedly, as described, but, in the end, failing to intimidate the intruder, he will abandon such tactics and produce his specialty from his bag of tricks.

With mouth widely agape, now, he writhes in apparent agony, twisting and squirming in a strange fit that at length leaves him inert—belly-side up! It almost seems as though the rascal has figured out that we could have no further interest in an already dead snake. Just what is supposed to have brought about his demise is not quite clear; perhaps we are expected to assume that he is the accidental victim of one of his own vicious strikes and that we are now witnessing its horrible effects.

We may pick him up without eliciting the slightest sign of life—unless we happen to turn him right side up, in which case a slowly executed half twist on his part again leaves him upside down. Apparently he has a very definite conception of the demeanor that becomes a dead snake. At any rate, he will hold that pose until satisfied that the coast is clear for a get-away, when he will cautiously right himself and proceed about his business.

In captivity he soon becomes tame to the point of declining to perform such stunts, but he is an interesting pet and a satisfactory one, in that he feeds readily. Though he will also eat frogs, he is especially fond of toads, despite the fact that *Bufo* possesses certain dorsal glands that produce an acrid secretion that is credited with discouraging most of his potential enemies. Occasionally a hog-nose will condescend to substitute a lizard for his regular diet. One specimen of *simus* that I kept became so familiar as to take food from my fingers.

The reaction of the stoical toad when faced with the fate of becoming a lunch is remarkable, his resistance, though purely passive, involving strategy of the highest



NO ACCOMPANYING CEREMONIES

This hog-nose, apparently not knowing all the tricks of the faker on the preceding page, just rolled over on his back and let it go at that

order. Upon perceiving *Heterodon simus*, he seems to recognize at once that here is a snake of which he has every reason to beware. Likewise he seems to be fully aware that this snake will trail and eventually overtake him, and of the consequent futility of simply hopping, as is his custom, away from approaching danger. Instead, if he moves at all, he crawls and hobbles awkwardly along, the obvious reason for this peculiar gait being worthy of note. Not only has he puffed himself up to utmost capacity by way of dissuading the snake from an enormous undertaking, but, to display this imposing size to best advantage, the legs on the side next to the enemy are folded close to the body while the opposite set of limbs is fully extended, so as to tilt their owner "on edge", thus affording the snake a more generous view of that broad back. This posture probably also serves to effectively present the afore-mentioned dorsal glands.

As a rule, *Heterodon simus* makes a thorough survey of the project while *Bufo* maneuvers to present the situation in the most unfavorable light by tilting this way or that, as dictated by the snake's whereabouts. There is room for doubt, however, that these measures influence the snake's decision, for he is a capable judge, and though his capacity may be sorely taxed at times, he rarely attempts the impossible.

But, if the toad's innocent deception falls short of accomplishing its purpose, failure is no disgrace and he accepts his fate philosophically. And Nature seems to have contrived a practically painless departure for the staunch little amphibian; at least he offers little resistance as the loose-knit jaws of the snake gradually draw him head first into the infinitely elastic throat, and there is nothing more than perhaps a nonchalant wave of a hind leg to indicate any discomfort in his passing.

A pintail duck on the Louis Agassiz Fuertes Wildlife Sanctuary, Ithaca, New York.

Pickerel weed, *Pontederia cordata,* a valuable food plant and a beautiful addition to any shallow pond.

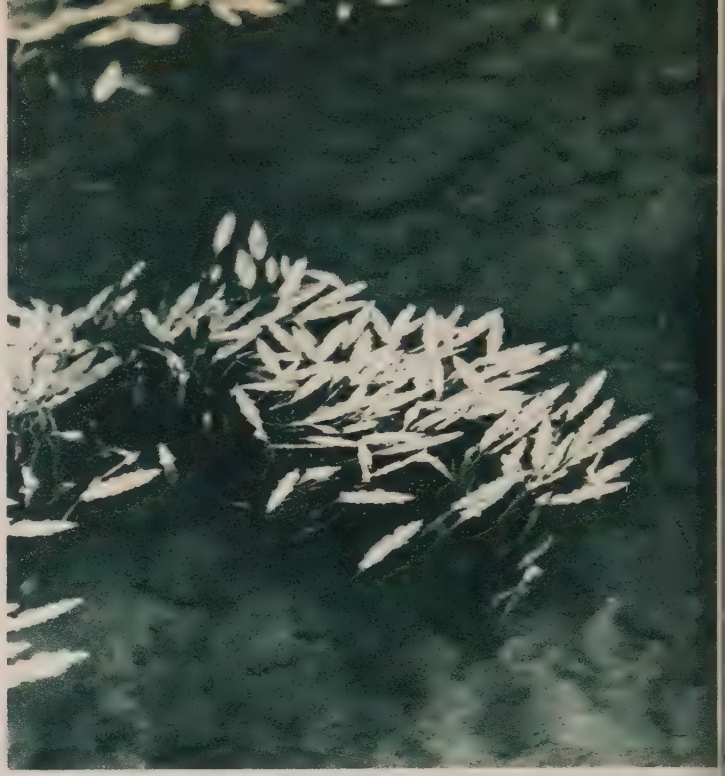
A Waterfowl Sanctuary

BY RAYMOND S. DECK

The ducks are on the wing! Into the North they fly on whistling wings, mallards and teals and widgeons, with bands of glittering wood ducks; canvasbacks sweeping by like giant snowflakes; fat scaups and trim pintails riding the wake of wedges of clanging geese.

Southern lagoons are left behind as the birds speed away on their heroic journeys, journeys as old as Time, as mysterious as Eternity. Drought-ravaged nesting lands are the goal today. Again the wilderness will hear the music of winnowing wings—the noble Mississippi and Athabaska, ice-choked Hudson Bay; your marshes and lakes, and mine.

But those mighty clouds of wildfowl that streamed across American skies a few years back —where are they now? These little flocks we see are but a tattered remnant. The black ducks and



Redhead and canvasback ducks, two favorites that were formerly abundant but now are threatened with extinction, are famous divers and feed on a variety of seeds, tubers and foliage.

Floating pondweed, ***Potamogeton natans,*** above, one of the more important of the group, is widespread over the United States and southern Canada. Not only the seeds and tubers are eaten, but to some extent the leaves also. It is thus useful to many species of waterfowl.

Burreed, ***Sparganium simplex,*** is useful about the margins of sanctuaries. Big duckweed, ***Spirodela polyrhiza,*** with its floating habit, is both useful and ornamental.

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widgeons that dotted the waters in the springs of your childhood? They're gone! Neither blasts of chilled shot nor exclamations of delight have saved them.

Perhaps there still is time to forestall this saddest chapter in the American Tragedy of Extinction. Perhaps! Sanctuary, surcease from relentless persecution; if this be not the answer there is none.

I have a pond. Little enough, it is true, of this world's goods, but I have a pond—*and ducks!* Only five acres, but clean and clear, trickling in from the hillsides in half a dozen tiny brooks. All about it are trees, berried shrubs and wild vines. There are no fences or fields, no roads, clear to the rim of my saucer of wooded hills. The shingle-mill that stood beside it long ago has fallen apart and its ancient bones have gone into the soil. It wasn't needed any more, for the big timber is gone, leaving only its tombstones of great red-rotting stumps.

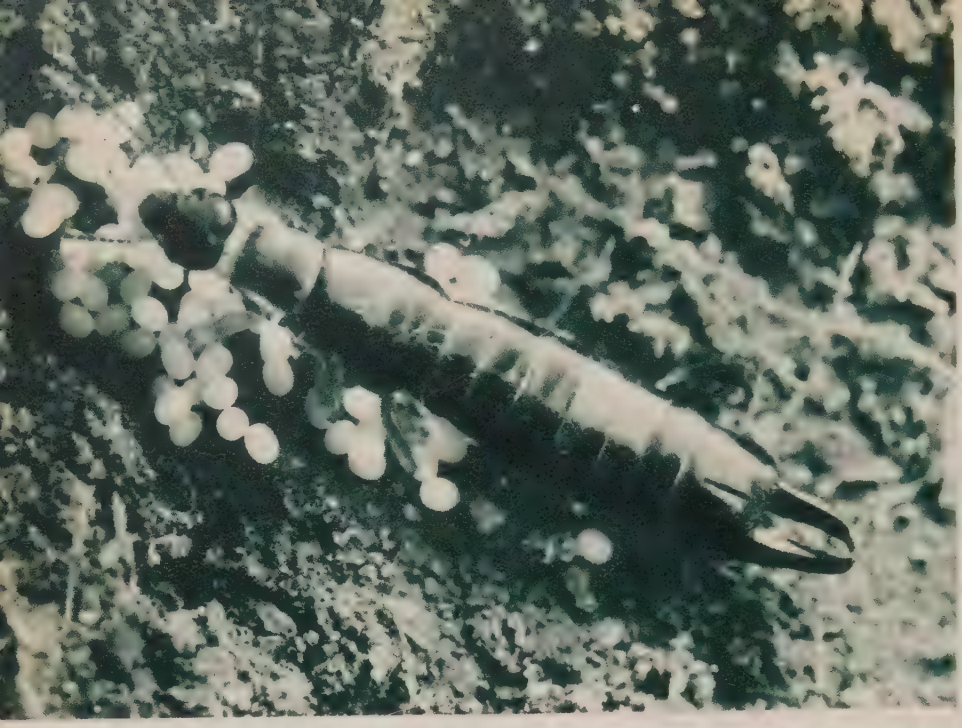
Tonight, at sunset, a pair of whistlers came to feast on the fat tubers of pondweed that have lain in the mud all winter under blue-white ice; black ducks, four, two more, a band of six, and more and more until my whole black duck flock is back again. Thirty-five big wary birds they are in all. Last October there were more, but that was before the bangs of guns boomed through the frosty air over Pine Lake way, and they dwindled and dwindled. *Ca-rew! Ca-rew-ew-ww!* That's a wood duck! There'll be more of them along, for three glowing drakes of their bantam clan, and as many gray

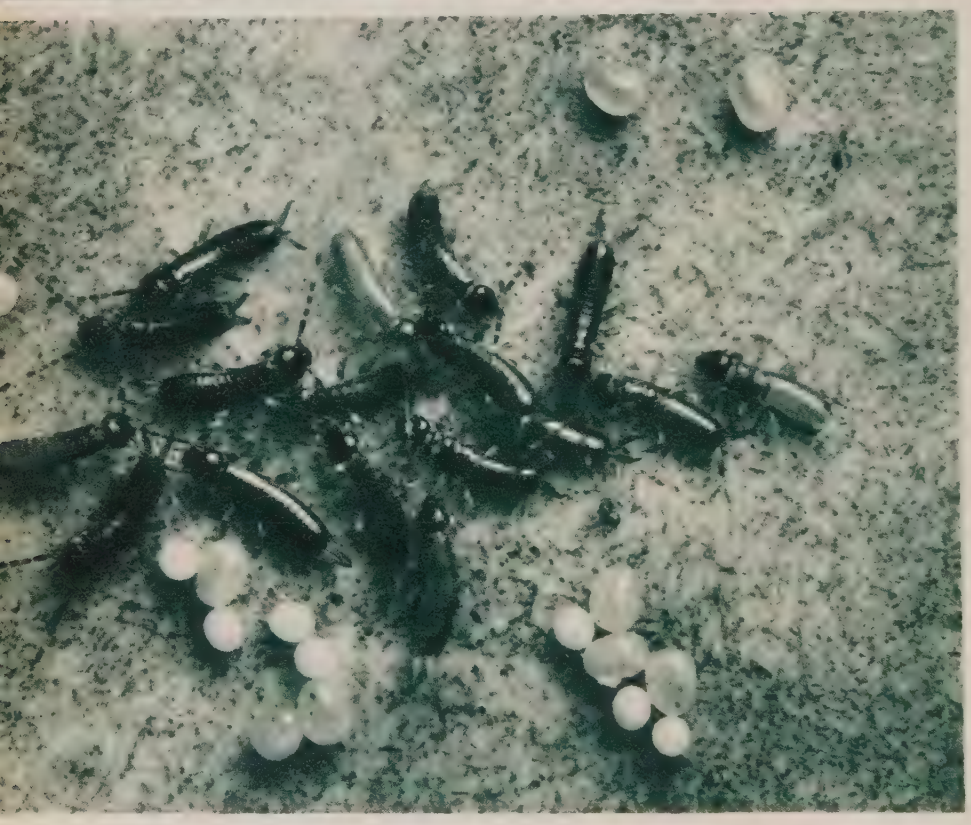
The Canada goose, widespread and a favorite, and the wood duck, most beautiful of all the ducks in America, if not in the world, are here pictured The continued existence of the goose, despite its immense breeding grounds, is seriously threatened, and certain forms of it are almost extinct. The wood duck, on the other hand, although it has a breeding range that is rather limited, still survives in goodly numbers, for its shooting has been forbidden for some years.

To the right are shown two waterfowl foods of wide utility, wild millet, *Echinochloa crusgalli,* and arrowhead or wapato, *Sagittaria latifolia.*

females, are always about when the ice is out, scooping up floating duckweed from wooded coves and the sheltered pools I've dug among the marsh grass. And the trio of scaups may come back tonight for a bit of grain scattered in the water, or a taste of wild celery, the *Vallisneria* you buy for your goldfish bowl; or my cocky little green-wing teal may drop around with his mate, to dabble about in the shallows for such wapato as the muskrats and black ducks have failed to unearth till now. It's almost too much to hope that a wedge of great migrant geese will ever find respite on my little pond. Still there's always the chance, for in the black of night I have heard geese calling from the clouds as they circled overhead, hoping, fearing, not quite daring to seek sanctuary from the April storm on this tiny droplet in their world of sky and water.

Yes, perhaps there still is time! Somewhere near your home you may know of a tiny pond, a protected river shore or a bit of marshland off the "sportsman's" path. Borrow it for the birds; no owner will say you no. Or you and your friends may buy a bit of waste lowland for your own as did the pioneers of Pleasant Valley who told their thrilling story in these pages a few months back. Plant it with food and cover for the ducks. Build dams; put out grain; scatter seeds. Plant roots and tubers in the ooze where none grew before. Get good wet mud on your hands and water on your clothes; they are the ointment of conservation. Get into the trenches! It's the zero hour for our waterfowl! This





THE EARWIG

The two pictures on this page, depicting the earwig, with her eggs and young, are by Lee Passmore. The common earwig, *Forficula auricularia,* of the old world, has been introduced in North America, and has been recorded in many places. It is nocturnal in habits, shunning light as much as possible, and living in cool, damp places often under stones and decaying boards. The body is somewhat flattened and dark brown or black in color. The hind extremity of the body is armed with a pair of pincer-like organs that open horizontally, and with these the mother earwig will defend her young against the attack of ants or other enemies. She remains beside the eggs during the incubation period of about thirty days, jealously guarding them.

The eggs of the earwig may be likened in appearance to the china eggs that are used to encourage the domestic hen. If the eggs are disturbed or a few are moved only a short distance from the rest, the mother will gather them immediately in her jaws and return them to the nest.

The second photograph shows a number of recently hatched young. The darkest ones were the first to leave the eggs, while the lightest colored in the group of seventeen were little more than one hour old. Young earwigs differ little, except in size, from the mature insect. Some of the eggs shown were newly laid but were placed close to those that were ready to hatch for purposes of comparison. The body of the young earwig shows quite plainly through the almost transparent shell. The mother remains beside her young for a time to protect them, but soon they become able to provide for themselves. The lower photograph, enlarged about six diameters, was taken by flashlight.

Catkins of Spring

Photographs by L. W. Brownell

The catkins that appear on many of our forest and street trees in spring are flowers that Nature has chosen to arrange in pendant festoons, the better to gain the assistance of wind and insects in the diffusion of the pollen that insures the perpetuation of the species.

First is shown one of the earliest of spring flowers, those of the alder, which as early as mid-March proclaim by its gracefully drooping catkins the advent of spring.

Next on this page are the pistillate flowers of the white or silver poplar, native of Eurasia, but planted commonly in North America. The staminate catkins are pictured on a succeeding page.

Then comes the quaking aspen, widespread in Canada and our northern states, blossoming before the delicate yellow-green leaves have burst their buds. All poplars bear the pistillate and staminate flowers on separate trees.

It is May when the oaks send forth their festoons of flowers. The scarlet oak, first on this page, come rather early in the month when the leaves are small. To many it seems that the delicate tracery of tender leaves set off by graceful pendants equals or excels in beauty that glorious autumn display that gives this oak its popular name. Next, the more sturdy red oak, which belongs to the same group as the scarlet and is not distinguished as different by many who have spent their lives among both. The red oak usually delays its blossoming until the leaves are full grown.

Before our groves were ravaged by the chestnut blight, brought over from Asia in stock that was hoped to supplement the benefits of our own beautiful native, the large graceful catkins of our common chestnut were always a welcome sight. To the youth of a dozen states they gave both present pleasure and assurance of future fruit for many a nutting jaunt when the first frosts of autumn should help the burs to open.

First on this page is a twig of the bitternut hickory, little esteemed for its fruit, but full of beauty in late April and May when the catkins open among the delicate half-grown leaves of yellowish-green.

Beside the road and on field borders, the hazel (a low shrub) grows in little thickets, furnishing fine nesting sites for chestnut-sided and prairie warblers. There are two species, almost indistinguishable until the nuts form in late summer. These are of interest chiefly to the chipmunks and red squirrels, although country boys sometimes sample them.

In nearly all parts of our middle and central states the black walnut is a joy to those who seek in early fall its rich fruits. In spring it also offers beauty in its flowers, which come among the springing leaves and give promise of its autumnal fruiting. The pistillate and staminate flowers often occur on the same branch, the latter in pendant, unbranched catkins, the former arrayed in a kind of spike on the tips of the branchlets.

The English call their white birch the "Lady of the Woods" and our own beautiful species is equally deserving of this praise at any season. But it is in spring, perhaps, when its staminate aments, which have been quiescent since the summer before, expand and shed their pollen for the benefit of the pistillate flowers that are just developing, that its beauty is most striking.

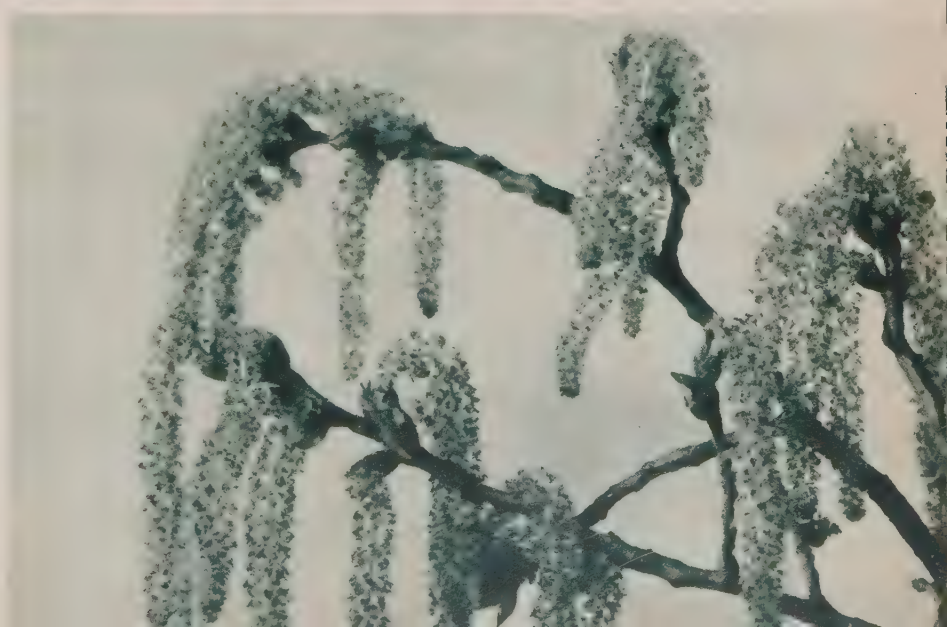
The Carolina poplar, probably a hybrid between the black poplar of Eurasia and one of our native cottonwoods, is commonly planted in many of our city streets. It is not a favorite as its robust staminate catkins litter the sidewalks, and its vigorous roots often disrupt curbs.

Native to the northeastern section of the United States and west to Minnesota, the large toothed poplar is a favorite. Its inflorescence is similar to that of the aspen, but the leaves are larger and widely different in form. In autumn the leaves show a tendency to reddish, in marked contrast to the clear yellow of the aspen at that season.

The black birch, cherry birch or sweet birch, the last name having reference to the flavor of wintergreen that tinctures the inner bark of its branches, is a good-sized forest tree of our northeast from Newfoundland and Ontario to Florida. In April or May, when the leaf buds are opening, the little staminate aments, which have been inconspicuous during the winter, expand into the long graceful catkins and discharge their pollen for the short green pistillate ones that come with the budding leaves.

The shagbark hickory delays its blossoming until the bright green leaves are well-developed, which usually brings it to May. As in the other hickories and in the walnuts, the staminate and pistillate flowers are separate, but usually occur on the same branch.

The white or silver poplar is a beautiful tree that came to America from its northern European habitat with the early colonists because they wished to have a shade tree that reminded them of their early homes. It owes its loss of favor and consequent decline in numbers to a characteristic that Nature intended should insure its perpetuation—its power to spread from roots. It thus made a nuisance of itself in many places and was banished. Here are shown its staminate catkins.



Pholcus phalangioides

As recorded by Lee Passmore

This species is easily distinguished from all other pholcids found in the United States by its larger size and the elongated form of the abdomen. The body is about one quarter of an inch long and the legs are sometimes more than two inches in length. In general form this spider closely resembles the harvestman, commonly called daddy longlegs. It is usually found in darkened places, where it spins its loose-hanging webs. During the mating season, the pair seek the darkest location they can find, where they remain for a considerable period.

The female carries her eggs, numbering about fifty, in a sac that is exceedingly thin-walled and almost transparent. It is spherical in shape and is grasped in the mother's mandibles. Rarely, if ever, does the female leave the burden she supports throughout the incubation period of about thirty days. The unhatched spiderlings can be seen plainly through the delicate egg shells. The long legs are folded about the body and the black eyes appear distinctly through both shell and sac. As the young hatch and leave the sac, they spin tiny webs and gather around the parent while she patiently waits for the last of her brood to be hatched. The mother protects her young for several days but the family soon separates. Each spiderling instinctively knows how to spin its own web and trap its prey in the approved way. Many of them become victims of their enemies and few survive to reach maturity and carry on the race.

American Salamanders

Photographs unless otherwise credited by L. W. Brownell

Salamanders include those amphibians that in the adult state possess tails; the toads and frogs are without these appendages. In general both groups agree in having a larval stage that is generally passed in the water. In the larval stage they breathe by means of gills that commonly are replaced by lungs in the adult. Most species are terrestrial except during the breeding season. A few guard their eggs during incubation.

First is the slimy salamander, *Plethodon glutinosus,* rather common throughout our Eastern states. It lives in most places in decaying logs or beneath rocks and leaves its eggs in similar places. Its food includes many insects, and earthworms, snails, spiders and millepedes. It reaches a length of six inches.

The mud puppy or water dog, *Necturus maculosus,* differs from most salamanders in retaining its gills, and consequently its aquatic habitat, throughout its life. It reaches a length of twenty inches. Since it eats many insects that live in the water, it sometimes competes with fishes.

The tiger salamander, *Ambystoma tigrinum,* dark brown with many yellowish spots and blotches, is rather widely distributed over most of the United States, but it is more common westerly. Its necessity for moisture limits its habitat; it is therefore absent from many desert and semi-desert areas. Often its presence is unsuspected unless one happens to be unearthed in an excavation, or appears in a damp cellar. Since it must lay its eggs in water it accommodates itself to seasonal moisture conditions. A captive individual has been known to live as long as twenty-five years.

The slender salamander, *Batrachoseps attenuatus,* would seem to be well named, popularly and scientifically. This particular specimen was found beneath a rotting log beside Chico Creek, California, and was photographed by Edwin G. England. As may be imagined from its tiny legs, its movements are slow and tortuous. The fifty or more eggs are laid in a damp location and the larvae lose their gills and develop legs during the latter stages of incubation. Breeding takes place in the wet season, and apparently the adults aestivate during the drier parts of the year.

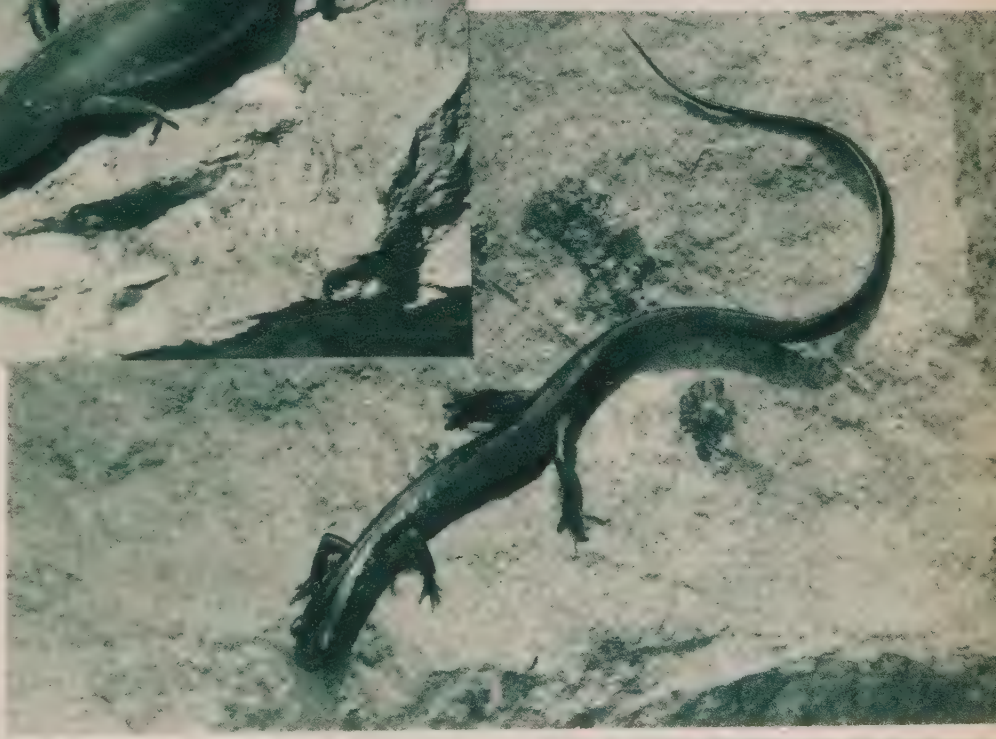
The spotted salamander, *Ambystoma maculatum,* is of rather general distribution in our Eastern states. It is seldom observed except at the time of breeding, which takes place in early spring, usually during the first warm nights in March. At this time the adults desert their subterranean retreats, and congregate in some pool, generally one that has been utilized for this purpose for many years. The eggs are laid in bunches, generally attached to a submerged twig or leaf. The gelatinous envelope that surrounds the eggs expands to a whitish mass in which the eggs hatch within a few days. Should the pool dry up, the transformation of the larval young is correspondingly accelerated and they assume the adult characteristics while still undersized. This species has been known to live in captivity for eighteen years.

The two-lined salamander, *Eurycea bislineata,* yellowish with two longitudinal black stripes, is common over much of our forested region. It is usually found beneath stones in or on the borders of shallow brooks. Here its eggs are laid and the larvae develop. When the creatures are dislodged they become exceedingly active in seeking shelter. A variety of insect food is taken, including adult and larval beetles belonging to several groups, flies, and bugs, as well as spiders, and mites.

The showy marbled salamander, *Ambystoma opacum,* is a medium sized, stockily built species that is commoner than many suppose. It spends most of its life in its retreats underground, but comes out in the fall to deposit eggs in pools that form with the autumn rains. Often the parents seek these places even before the rains arrive, depositing the eggs in a mass and guarding them until the pools are flooded.

Our common newt, *Triturus viridescens,* pictured at the left, is rather generally distributed throughout the Eastern states. Its general color is olive green above and yellowish below, with small spots of red or yellow on the sides. It is mainly aquatic, but during the second year of its life it is terrestrial, and vermillion red in color. It breeds in the water, in its third year. It does not hibernate and frequently may be seen beneath the ice in our smaller streams.

Jefferson's salamander, *Ambystoma jeffersonianum,* is rather widely distributed in our Eastern states, but is relatively rare. It is olive brown or blackish, usually varied with bright spots, but sometimes is unmarked.



The long-tailed, or cave salamander, *Eurycea longicauda,* is one of our most beautiful species. Its extremely slender form, with its bright orange-yellow color varied with small black spots above, and its slender keeled tail barred transversely with black, combine to form as dainty and graceful a creature as can well be imagined. It is abundant in the limestone caves of Indiana and Kentucky, but occurs also in springs that flow from rocky hills in many places outside of limestone sections. Its diet includes spiders, mites, millepedes, and many kinds of insects.

Last on this page is the Texas salamander, *Ambystoma texanum,* which seems to be known chiefly from south-central Texas.

Tropical Cannonballs

By
HUGO H. SCHRODER

One of the most remarkable of introduced tropical trees is a 40-foot example of the cannonball tree growing in Fort Myers, Florida. Notable in many ways, this specimen is thought to be the only one in this country that thrives and regularly produces fruit. The species is a native of the Guianas, and is a near relative of the Brazil nut tree. It is known scientifically as *Couroupita guianensis*. The large pink or red blossoms are arranged on pendant woody racemes up to three feet in length, which issue in profusion from the trunk and larger branches. The blossoms are decidedly fragrant. None appear on the smaller branches, as is usually the case with most other trees. The mature fruits are globular, six to eight inches in diameter, and the word cannonball describes them quite accurately. Frequently only one matures on a flower stalk. A number of seeds, somewhat resembling a flattened Brazil nut, are packed inside of the hard outer case and these are surrounded by a rather vile-smelling pulp.

A desire to examine the insides of a "cannonball" brought forth some unexpected and rather unpleasant results. When I threw it against a tree in order to break the hard outer shell, a vegetable gas bomb seemed to explode under my nose. A rather hurried inspection of the nuts sufficed to satisfy my curiosity about the cannonball's makeup, and I proceeded to bury the malodorous mess as quickly as possible. Even then the unwelcome odor lingered in the neighborhood for hours afterward.

During my residence in Fort Myers, I witnessed a complete defoliation of this tree, several times in the course of a year. On each occasion a new crop of foliage appeared a few weeks later. Shedding the leaves and growing a new crop seemed to proceed without any regard to season. Thus there were flowers and fruit on the tree at the same time.

Bird Nesting in Montana

The photographs on this and the succeeding page were taken by V. L. Marsh mainly on Woody Island in Lake Bowdoin, near the Canadian border in north-central Montana. All except that of the curlew were taken in mid-June, 1935. Lake Bowdoin is one of the most important breeding places for water birds in the state, and for many years has been the center of bitter controversy—sanctuary versus shooting grounds. In view of the testimony these pictures offer of an oasis in the midst of a near-desert caused by drought and settlement, it would seem that the conservationists have the better evidence back of their contention. The birds now present, however, are but a handful compared to past numbers. In the center foreground a double-breasted cormorant is feeding its young on a nest whose height indicates long use. Here the white pelicans, whose tribe has suffered sadly during the past few years from persecution, seem to have had good success in bringing their young to a stage where their safety is assured.

This American avocet was photographed in June on Avocet Island, Lake Bowdoin. The nest of eggs was taken a few days later near the same place. In this nest we see the arrangement of eggs that is almost universally characteristic of all shore-birds.

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Here are shown a few of the great blue herons that were successfully nesting on Woody Island in June. In view of the relentless and unjustified persecution that is threatening the existence of this fine species, it is good news to know some that are able to raise young.

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A long billed curlew sits on her eggs near Craig, Montana, and was photographed at this parental duty in late May.

★ Conservation ★

A section of Nature Magazine devoted each month to the expression of practical opinions on the vital issues affecting our use and abuse of natural resources, including wildlife, and dedicated to the purpose of assisting Americans to play a militant part in the attainment of constructive conservation aims.

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LET'S PASS THE LONERGAN BILL

"Let's Make 13 a Lucky Number" has been adopted as a slogan in the drive for the passage of the Lonergan Bill, S. 13, that seeks effectively to check pollution of our streams. Reported favorably to the last Congress, but too far down on the calendar for action, Senator Lonergan's measure has been re-introduced and is now S. 13. We believe that the early solution of the pollution problem will be best served by the passage of this bill. The Izaak Walton League is in the forefront of the drive for the bill.

It is not our intent here to go into the details of the pollution situation. This was adequately covered in an article in our July, 1936, issue. Conditions certainly have not improved and the vital need for real pollution control increases. It is, however, pertinent to discuss the legislative situation as it now confronts us.

In the last Congress, following the introduction of the Lonergan Bill, a number of so-called pollution bills were proposed. These were finally fused in the Barkley Bill, put forth as an alternative and now before Congress as S. 702. The legislative issue, therefore, is between these two.

During last summer, conferences were held between supporters of the Lonergan Bill and the adherents of the Barkley Bill, the latter being chiefly the U. S. Public Health Service. It was hoped that an agreement could be reached. Representatives of the conservation groups supporting Senator Lonergan's proposal asked only that a bill, whatever its name and by whatever agency administered, contain mandatory provisions to carry pollution into effect.

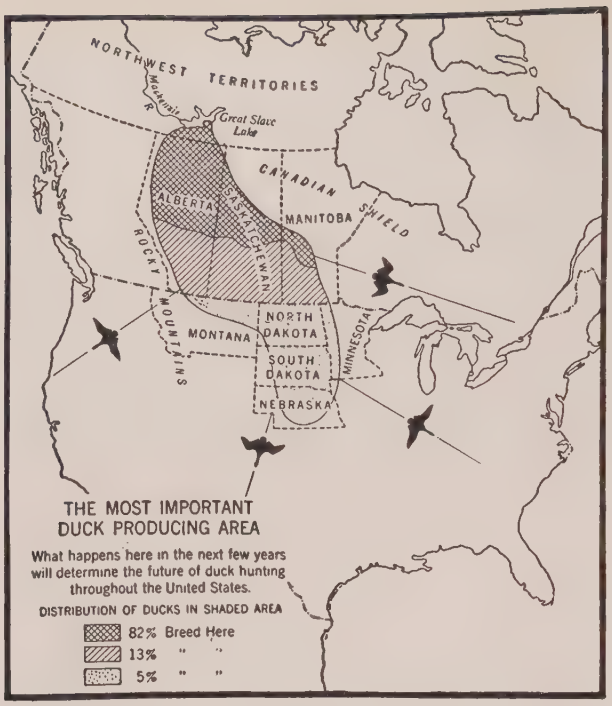
Public Health Service officials refused to accept this suggestion. They claimed that the loan and grant provisions of the Barkley Bill would serve as sufficient "bait" to induce polluters to install treatment plants. In adopting this attitude they ignored the fact that just such an opportunity has existed for some time through PWA funds, but no amount of goading has brought action by the polluters. It was, in fact, proposed to the meeting by the Public Health Service that this voluntary plan be tried for ten years. If, after that time, polluters did not act, it would, they said, then be time to introduce mandatory provisions. What the condition of our streams would be after ten more years of pollution was left to conjecture.

It was, perhaps, with the medical conservatism of mind, the feeling of the Public Health Service that they should have time "for further research and investigation." This refuge of the bureaucratic mind is without justification in connection with pollution. There has been enough research and investigation. The facts and conditions are known. The opportunity for industry to cooperate in checking pollution virtually has been ignored. The time has come for mandatory action.

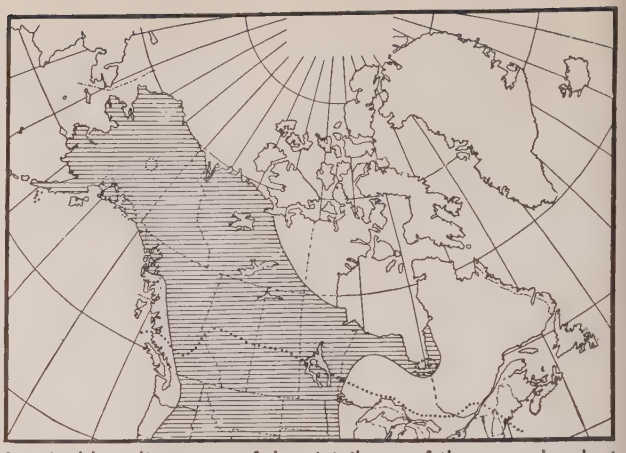
It is also interesting to note that we find arrayed in support of the Lonergan Bill sportsmen and conservationists and every national conservation group that has considered the measure. We find that the opposition to S. 13 and the support of the Barkley Bill arises from the Public Health Service, most State health services, and from the manufacturers who want a voluntary measure under which they can continue to do what they please.

It is only natural that the Public Health Service is for the Barkley Bill. It would give the Service $300,000 for administration through a Division of Water Pollution Control. It would give them $700,000 to parcel out to the States so that their respective health authorities may spend it "in the promotion, investigation, surveys and studies necessary in the prevention and control of water pollution." We all like to spend money if we can get it to spend, and the Public Health Service is no exception.

Devoting more millions to studying pollution is ridiculous and a waste. Devoting it to actual control of pollution is plain common sense. That is why we believe that S. 13 should pass. Why mark time when we can march.



Waterfowl map of "Ducks Unlimited" which carries its own sadly misleading legend



Principal breeding range of the pintail, one of the more abundant of our ducks, which nests in suitable places throughout. The mallard and the green-winged teal occupy nearly the same range, and within it are also the main producing areas of the scaups, widgeons, buffleheads, shovelers, scoters, goldeneyes and most of our geese. This region thus produces most of our waterfowl. The dotted line shows the northern limit of shooting for sport; it is also the limit of drought, general agriculture, and intensive settlement. The region south of it is now almost shorn of its former importance as a waterfowl nursery by these hazards.

"Ducks Unlimited" Latest Scheme to Defer Adequate Protection

A PROGRAM launched by More Game Birds in America "to restore the wild duck factory" in the Canadian breeding grounds, is now being accorded wide publicity. We are told that "Ducks Unlimited", a national organization of American duck hunters recently incorporated in the District of Columbia, seeks the preservation and restoration of Canadian duck breeding grounds. For this purpose the foundation hopes to raise several hundred thousand dollars annually during the next five years.

In explaining its purpose and aims, the Foundation asserts:

"Extension of the federal refuge program will help the conservation of wild ducks, but even maximum production on all the breeding grounds in the United States cannot result in a marked increase in the total continental duck crop.

"Only five percent of the prairie breeding ducks now nest in the United States, it is estimated. Thirteen percent nest in the southern half of the three Canadian provinces. Eighty-two percent, however, have been driven still farther northward to the last unspoiled limits of the duck factory.

"Geological barriers—the Rockies on the west and the Canadian Shield on the east—come together near the northern border of Alberta. Here the ducks are literally being 'driven to the wall' by the advance of civilization.

"What happens in the Canadian portion of the great duck producing area in the next few years obviously will determine the future of duck hunting throughout the United States."

With most of the conclusions thus stated, we are in hearty agreement. The percentage estimates are probably not far from the truth. We differ only as to the geographical limits and the reasons for the presence of the eighty-two percent that it is stated "have been driven northward."

In the accompanying map, distributed by More Game Birds in explanation of the statements we quote, the cross-hatched portion really represents the best producing area per square mile for a number of species of prairie-nesting ducks. These are the canvas-back, redhead, bufflehead, ruddy and ring-necked ducks, and the blue-winged teal. These species are all so reduced in numbers as to deserve total protection, and the four first named are all so protected, at least nominally.

But there remain several other species that can be fairly classed as prairie nesters whose breeding ranges extend much farther north. These include the pintail, mallard, green-winged teal, shoveler, widgeon, and scaups of two species.

On the map that we here reproduce is shown the Canadian and northern plains breeding range of the pintail. The mallard and green-winged teal also occupy most of this territory, while the baldpate or widgeon, scaup, bufflehead and shoveler have less extensive ranges, mainly west of the Canadian shield, but extend to Alaska. There are several other species, such as the scoters, not properly classed as prairie nesters, but which are just as good ducks to most shooters, that also nest in the millions of ponds and marshes that airplane maps show us are scattered over about two millions of square miles in northern Canada and Alaska. (Continued on page 242)

In the March issue of Nature Magazine we published an article critical of our past expressions on the subject of the wilderness. At the same time we promised an article that we regarded as a splendid analysis of the wilderness question. We are willing to rest our case for the wilderness with this discussion by Mr. Marshall.

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The Universe of The Wilderness Is Vanishing

By ROBERT MARSHALL

Photographs by the author unless otherwise credited

WE HAD ridden all day, across one deep gulch after another, until we reached the sprawling log cabin in the bright valley of Wild Horse Basin. Here we unsaddled, twenty-five miles from the end of the nearest wretched road, where automobiles could penetrate only with much bouncing, and seventy-five miles from the nearest paved highway. After we had turned the horses loose, Jik went into the low slung hut to doze for a while, and I headed up the hillside and across the mesa to where they told me Green River Gorge lay two miles away.

It was a sunny, leisurely stroll through an open stand of junipers, and it filled me with the notion that the world was gay and easy and peaceful. There seemed to be an impenetrable isolation between me and the world of repression, hunger, disease, warfare, unemployment, and endless machinery, which lay somewhere beyond the farthest visible mesa. The day was so bright among the junipers and the air so quiet, you couldn't think of anything else.

The mesa started to slope gently downhill. I passed an old cowboys' campfire with a pile of wood beside it, and pushed my way through a thick clump of juniper to a rocky ledge. Then all at once the mesa broke away below me. It broke away into a gorge so deep and tremendous that space and time were lost in its immensity. There were no longer any physical measurements, no substantial world for comparison, only an overwhelming feeling of infinity that surged out to fill up every recess of the mind.

I don't know when I changed from standing to sitting, or whether I sat there for minutes or hours. I can't recall in what order impressions surged over me. There was no sequence; just observations and stimulations and perfection, all jumbled outside the zone of reason. Far below a strong, gray river tore down the canyon with a roar so distant it seemed as if it must have been in some orbit of different life. Beyond it were myriad

BUTTER CREEK IN THE MOOSE RIVER WILDERNESS IN THE ADIRONDACKS

side canyons winding tortuously down to the main river, each one a huge slit in the crust of the earth, worn down by the force of water through one parallel layer after another of clean, tan rock until you lost count of the strata. But you knew that each layer of rock represented in its up-building a passage of time longer than all the period of human history, and each slit represented as long and tedious a process of tearing down.

I sat on the brink of this two-way infinity—incomprehensible, far beyond any age or world. The wind blew up from the river, fresh and mysterious against my face. The air was alive with the faint odor of juniper. Far, far away, beyond the river, beyond the canyons, beyond countless miles of mesa, so far away that they were sometimes mountains of earth and sometimes mountains of an ancient, dried out moon, rose a snow-covered divide that seemed to bound the universe. Between me and this dimmest outpost of the senses was not the faintest trace of the disturbances of man; nothing, in fact, except Nature, immensity, and peace.

I know that someday I will read about a road being projected down the gorge of the Green River. I have read similar articles about many other wildernesses. The article will state how many miles the distance between Vernal and Moab will be shortened, how many men will get work, how many tourists will leave their money

SANDSTONE WIND SCOURING IN THE HEART OF THE LARGEST ROADLESS AREA IN THE UNITED STATES IN SOUTHEASTERN UTAH

along the route, how many millions of dollars it will cost the government. The article will say nothing about whether all of these values might not be less important than the value that one person could formerly experience while sitting alone with infinity. It will say nothing of the great gashes quickly dynamited by man into the timeless rocks that previously had been gashed only by the forces of geologic ages. It will say nothing of a universe destroyed.

Yet the universe of the wilderness, all over the United States, is vanishing with appalling rapidity. It is melting away like the last snowbank on some south-facing mountainside during a hot afternoon in June. It is disappearing while most of those who care more for it than anything else in the world are trying desperately to rally and save it.

To many the story of the vanishing wilderness will bring only a negative response. "What's the difference; where's the loss?" they will say. "Only romantic children imagine that we can bring back the days of Lewis and Clark. Let's grow up and realize that primitive adventure is an unnecessary luxury we can't afford."

I would answer that we can afford to sacrifice almost any other value for the sake of retaining something of the primitive. It is not a new idea, for Thoreau, more than 80 years ago, wrote: "Our life would stagnate if it were not for the unexplored forests and meadows which surround it. We need the tonic of wilderness. We can never have enough of Nature. We must be refreshed by the sight of inexhaustible vigor, vast and titanic features, the seacoast with its wrecks, the wilderness with its living and decaying trees."

To countless people the wilderness provides the ultimate delight because it combines the thrills of jeopardy and beauty. It is the last stand for that glorious adventure into the physically unknown that was commonplace in the lives of our ancestors, and has always constituted a major factor in the happiness of many exploratory souls. It is also the perfect esthetic experience because it appeals to all of the senses. It is vast panoramas, full of height and depth and glowing color, on a scale so overwhelming as to wipe out the ordinary meaning of dimensions. It is the song of the hermit thrush at twilight and the lapping of waves against the shoreline and the melody of the wind in the trees. It is the unique odor of balsams and of freshly-turned humus and of mist rising from mountain meadows. It is the feel of spruce needles under foot and sunshine on your face and wind blowing through your hair. It is all of these at the same time, blended into a unity that can only be appreciated with leisure and which is ruined by artificiality.

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In the summer of 1929, at the height of the prosperity tourist boom, I was standing on the rear deck of one of the Alaskan steamships, looking at the mountains that rose majestically from the shores of Resurrection Bay. A loquacious fellow traveler walked up beside me and started to promote a great idea. In effect he said: "This trip is pretty nice, all right, for a person who don't care anything for adventure, but I was reading an article coming up here on the boat about a man called Stefansson. He did all sorts of explorations, way up north here, somewhere north of North America. These Alaskan companies are missing a big bet. What they ought to do is build a road up to the mouth of the Mackenzie River and then ferry you across to some of them islands north of the mainland, and there's what the tourist would really like, to go somewhere where

THE CONTINENTAL DIVIDE AT THE HEAD OF THE NORTH FORK OF THE POPO AGIE RIVER, WIND RIVER MOUNTAIN WILDERNESS

everyone hasn't gone before. Give every man a chance to be a Stefansson!"

Last autumn I drove over a new highway that took me by a lakelet in the Rocky Mountains. I had been to that lakelet about seven years before. At that time it was just out there among the trees in the wilderness, with all that you could see and hear and feel in harmony with the primitive. I remember there were half a dozen ducks swimming around near the inlet, as unconcernedly as if they had never seen a human being before. Everything about the place, from the bright green sedges that surrounded the lake, to the lodgepole-covered mountain sides that rose from its shores, to the rock-covered pinnacles that jutted far above it, was a perfectly new, untrammelled world, just as if it had come fresh from the dawn of time. It was far beyond the outposts of civilization, where only the competent and the adventuresome could delight.

WASHAKIE MOUNTAIN AND WASHAKIE LAKE IN THE WIND RIVER MOUNTAIN WILDERNESS

But last autumn that whole world was changed. I was driving by just another body of water to be glimpsed for a few minutes; driving by in a closed automobile, over a broad highway. I had the feeling that the road and the auto and I were just a bit of any city, rudely dumped into the primitive I had known, completely shattering every impression of the untrammelled. The former thrill to all of my senses was crushed out by the great, scarring avenue, the gas-filled atmosphere, and the noise and stuffiness of a closed automobile. Gone too was the exhilaration of competence. There was no more adventure than on the sidewalks of Central Park. Lodgepole-covered mountain sides yet rose in the background, and there were still jagged peaks, but the whole effect was of something totally different and of something vastly inferior.

In pointing out the damage that this road did, I am not stating positively that it was not justified. I am sure that the beauty that can yet be seen has brought additional joy into the lives of many people who would never have been able to visit the area as a wilderness but who still derive some thrill from this inferior version of the original, somewhat as the old lady who can't ever have the opportunity of seeing the real portrait of Whistler's Mother, still gets a thrill from the modified version on the postage stamp. Unfortunately, however, my analogy is not complete. While Whistler's-Mother-on-the-postage-stamp did not in the least damage the original painting, the road to which I have alluded had wrecked the values of the wilderness. It was as much of a discord on the shore of this western lakelet as it would be if the Philadelphia Orchestra were suddenly to stop in the middle of Schubert's *Unfinished Symphony* and break into the strains of *Dancing Cheek to Cheek.*

There are many things that depend for their value on their total impression on all of the senses. Fragments of their unity mean almost nothing. The Mona Lisa has given many people a supreme esthetic thrill, yet if you cut it up into little pieces one inch square and distributed it among the art galleries of the world so that millions might see it where hundreds see it now, neither the millions nor the hundreds would get any genuine value. Similarly, if the French government in order to augment its revenues sold to Pepsodent for a few million francs the right to paint a modest advertisement on just a minor fraction of the famous portrait, the Mona Lisa would be dead. Of precisely the same nature are the *Unfinished Symphony* and wilderness lakelets. All of them are destroyed by fragmentation or pollution.

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Wilderness skeptics in almost all arguments raise the question: "Why should we set aside a vast area for the enjoyment of a few hundred people when roads would make that area available for half a million? Aren't we obligated to consider what will bring the greatest good to the greatest number?"

The doctrine of the greatest good to the greatest number does not mean that this laudable relationship has to take place on every acre. If it did, we would be forced to change our metropolitan art galleries into metropolitan bowling alleys. Our state universities, which are used by a minor fraction of the population, would be converted into state circuses where hundreds could be exhilarated for every one person who may be either exhilarated or

THE GRAND CANYON WILDERNESS ON THE HUALAPAI INDIAN RESERVATION, ARIZONA

depressed now. The Library of Congress would become a national hot dog stand, and the new Supreme Court building would be converted into a gigantic garage where it could house a thousand people's autos instead of Nine Gentlemen of the Law.

Ridiculous as all of this sounds, it is no more ridiculous than the notion that every acre of land devoted to outdoor recreation should be administered in a way that will give the maximum volume of use. Quality as well as quantity must enter into any evaluation of competing types of recreation, because one really deep experience may be worth an infinite number of ordinary experiences. Therefore, it is preposterous to hold that the objective of outdoor recreational planning should be to enable the maximum number of people to enjoy every beautiful bit of the outdoors.

It is worth noting that the use of the primitive outdoors is increasing by leaps and bounds. Most wilderness areas have ten people traveling in them today for every one person who traveled in them twenty years ago. A number are already overcrowded. Furthermore, whenever the general economic level of the country rises, wilderness use is bound to rise also. A striking illustration of this principle from a slightly different angle is furnished by the Trail Rider trips that the American Forestry Association has initiated. They have made it possible for eastern people, with incomes as low as $1600 a year, to visit these Rocky Mountain wildernesses, something impossible at former costs.

A few years ago if you wandered into any of the large eastern stores and asked for the ski department, you were ushered with some amazement into an obscure corner of the building where you might be shown two or three pairs of skis and a few wistful looking poles. Today all this is changed. When you now enter such a store, you merely follow the crowd to the ski department, and after an hour or two of elbowing you may finally be fortunate enough to get a clerk to wait on you. The railroads put on low-rate ski trains that carry enthusiastic people as much as 400 miles to favorable skiing grounds. Tens of thousands who a couple of years ago went for auto rides on Sundays now have suddenly discovered the thrill of doing something on their own power.

All the while, year after year, the United States becomes more and more mechanized. The life of one person after another has been saturated by machinery. Human beings require compensations, and it seems inevitable that as the machine age expands the need for an escape will also expand. It is this need that has already been reflected in the increased use of the primitive, and the craze for skiing. Certainly, it will be immensely expanded in the future as the cost of primitive trips becomes lower, the average income higher, and the need for an escape from the all-abounding machinery more intense.

Of course, non-primitive forms of recreation will continue to bring joy into the lives of multitudes to whom the true wilderness would be as unattainable as the canals of Mars. However, this should not mean that the minority that is able to enjoy the far greater elation of wilderness travel must have every primeval tract destroyed by routes of facile transportation. It would seem only reasonable that the available outdoors should be divided among both types of enjoyment. Each group should be tolerant enough to respect the variety of pleasure that the other desires. Similar tolerance is the accepted rule with most types of esthetic experience. The old lady who admires the postage stamp replica of Whistler's Mother does not demand that the original be destroyed. The person who prefers the jazzy strains of *Dancing Cheek to Cheek* to the *Unfinished Symphony* does not insist that the Philadelphia Orchestra should alter its program in order to appease his musical taste and wreck those of the symphony lovers'.

It would seem just as possible for the person who enjoys the outdoors by motor to obtain in ample extent his favorite recreation without extinguishing much more of the primitive. There are already about 3,500,000 miles of roads in the United States, enough at 50,000 miles a year to last a person 70 years, with the opportunity for building a large additional mileage of splendid scenic value without invading any important wilderness areas. America is big enough and rich enough for both primitive and non-primitive recreation, if there is some subordination of selfishness and rational, balanced planning.

All types of commercial land use conflict fatally with primitive values. The commercial activities that today most frequently invade the wilderness are irrigation, waterpower development, mining, grazing, and logging.

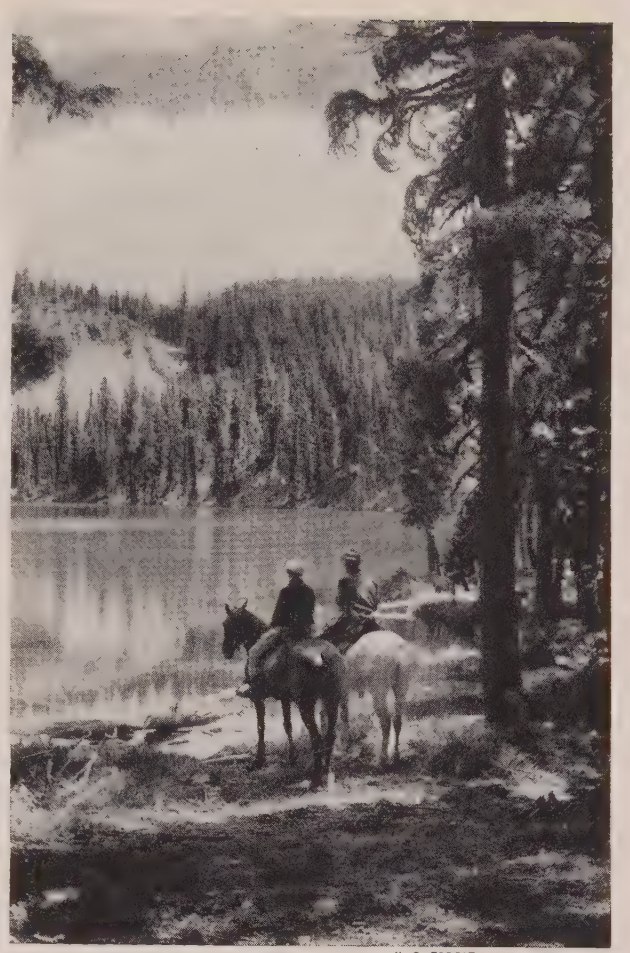
There is need all over the West for more water to enrich the farmlands, and consequently irrigation developments are constantly being projected into areas that have not yet been upset by man. Every project of this nature should be subjected to vigorous scrutiny to determine whether the increased amount of water made available for agriculture compensates for the destruction of recreational values.

In a similar way, it is desirable to balance the gains and losses that might come from each proposed waterpower project. A river, with a concrete dam that impounds a rising and receding lake, is wrecked as a primitive retreat, however important the power may be. It is necessary to consider whether the power or the primitive recreation could be obtained better at another place.

In an area of great scenic value the sight of a prospect hole and ore dump is apt to look more drab than the remains from an ordinary forest fire. However, it has long been one of the American heritages that every man should have the right of prospecting to his heart's content, and consequently prospecting is legally permissible on practically all federal lands except the National Parks. From the standpoint of rational planning it would be far better if we were to reserve for future generations as much of our mineral wealth as we can spare today, because mineral resources are not replaceable. Nevertheless, many minerals are being forced on the market by eager miners more rapidly than there is any genuine demand. Therefore, it seems logical that the government, while it cannot prevent prospecting on most of its land area, should not facilitate it through road building.

All through the Western rangeland the grazing of sheep and cattle is altering the native vegetation. The number of livestock in that vast domain between the 100th meridian and the Sierra-Cascade divide is greatly in excess of what the land is capable of supporting. Consequently, although the great majority of the present herds are at best merely large enough to give their owners a fair subsistence, even they will have to be reduced materially in order to curb the disastrous soil erosion that is rapidly gnawing away the land. Such a reduction will make it impossible to reserve from grazing any large areas of range land in addition to those National Parks, Wildlife Refuges, and portions of National Forests which have already been withdrawn, unless provision is first made for supporting the excess population of the interior West.

The national need for wood as a raw material is an important one. However, we should remember that, even though it may mean increased price, substitutes for most wood products are available, but there is no substitute for the beauty of the primeval forest. When once the forest is cut, this not only terminates forever the immense esthetic values of the primeval vegetation, but it also necessitates the invasion of the area with facilities for



U. S. FOREST SERVICE PHOTOGRAPH

LAKE COMO IN MOUNTAIN LAKES PRIMITIVE AREA, ROUGE RIVER NATIONAL FOREST, OREGON

mechanical transportation. This damage to much of the primitive is justifiable on the basis of balanced needs. However, there are major limitations. If we do our logging in a way that will enable the forest to reproduce itself, there will be no difficulty in growing all the wood we require on three-quarters of our forest area. If we continue to deplete permanently most of the area that we log, then we will cut every acre of timberland in the country and exhaust our wood supply. The solution of our timber problem is not to cut over every acre of virgin forest, but to practice forestry.

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At the present time the most prevalent destruction of the wilderness comes from truck trails that are built for fire protection. Nevertheless, these fire roads are by no means certain to reduce the fire loss. They have one important advantage and two important disadvantages. The great advantage is that truck trails enable men to be brought to fires more rapidly and in a fresher condition than if they have to travel all the way by foot. This unquestionably is a significant consideration and in some cases it will be of dominant concern. However, it is far from being the whole problem.

Every person in the woods is a potential source of fire, and therefore when an area that had been accessible only by trail suddenly becomes accessible to autos there

will be a vast increase in the number of forest fires. I realize that many advocates of truck trails urge theoretically that they should be stub roads, on which only the cars of the protective organization would be permitted. However, in actual practice, public pressure has generally forced the opening of such truck trails to general traffic. In many cases public pressure has also forced the government to join disconnected truck trails into a regular transportation system. As an example, the Ely-Buyck road, which cuts the wilderness of northern Minnesota in two, was started as a couple of far removed stub truck trails to be used solely for fire protection. Gradually these were lengthened, and then, all at once, before anybody seemed to realize it, there was a highway right through the heart of this wild country.

Even if it were possible to keep such truck trails closed to public use, they would still involve an increased fire hazard because of the opening that the right-of-way makes in the canopy of the forest. Such an opening admits the sun and wind, which dry out the needles, twigs, branches, old logs, and other debris lying on the floor of the forest. The drier such materials become, the more inflammable they become, and the more rapidly and fiercely fire will spread. Furthermore, when the mineral soil of the wild forest is exposed in road building, weeds generally become prolific and dry up in the autumn, making a much greater fire hazard than the normal forest vegetation. Even if truck trails are kept closed to automobilists, they can not be kept closed to hikers, hunters, and fishermen who want to walk along them, and many of such people inevitably throw away lighted cigarets, dump out pipe heels, and leave camp fires unextinguished. When this is done along a truck trail with its increased inflammability over that which exists along the narrow opening of a foot trail, it will mean that fire will start more readily and burn more fiercely.

In every area to be protected, it is necessary to balance the advantages and disadvantages that truck trails possess from a fire protection standpoint. If the balance appears to be in favor of truck trails, then it is necessary to consider whether this advantage is sufficiently important to offset the wilderness values destroyed. If the protection without roads over a considerable period of years has been effective enough to hold the average annual burned area to a small fraction of one percent, then it would seem as if the slight improvement which would be possible could seldom balance the destruction of wilderness conditions which roads and truck trails render inevitable.

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Another conflict with the primitive occurs in the development of transportation facilities. If a new highway is genuinely needed for the economic welfare of a large group of people, there could ordinarily not be any valid objection. However, roads that are not genuinely needed are being proposed constantly. I know of three seriously-advocated highway projects that would cost many millions of dollars apiece, that would cut across our three largest remaining forest wilderness areas, but which from a transportation standpoint would merely decrease by a few hours the distance between some small cities. The road now being constructed down the Locksa River in Idaho, through the heart of the old Selway wilderness, was actually praised by local boosters on the ground that it would shorten the distance from New York to Portland, Oregon, by forty miles. The real reason behind many proposed roads is that they will tend to divert traffic to towns that hope thereby to derive an additional income from the traveling public. However, it is obvious that with a limited amount of money to be spent by the traveling public, one town's gain will be an equally estimable town's loss, and the net result will be approximately the same as with the chain letter hoax.

It is well to bear in mind what is sometimes easy to forget, that millions of farmers are still floundering in the mud for a good part of the year because there is not enough money available to reconstruct on decent standards the vast road mileage which has already been scraped out on a bouncing, quagmire basis. It seems far better to spend what money is available in relocating and improving such existing roads from farm to market than in building entirely new roads of dubious merit. It is also true that if we are to maintain our existing roads on a reasonable standard, the cost will run well into the hundreds of millions of dollars, and therefore we ought to consider carefully before we construct any additional mileage to increase this huge financial burden.

The world is full of conflicts between genuine values. Often these conflicts are resolved entirely from the standpoint of one of the competing values, and thus whole categories of human enjoyment may be needlessly swept away. It is far more conducive to human happiness to attempt some rational balance that will make possible for the immensely different types of people the varied values they crave. Emphatically this is true of the conflict between the values created by the modification of Nature and the values of the primitive.

Unfortunately, such rational balance will not be likely unless the well-organized groups who desire to invade the wilderness are counteracted by well-organized groups for its defense. Legislators, and through them government bureaus, are controlled in the final analysis by public pressure, and if this pushes entirely from one direction, effective balancing of values is impossible. Therefore, the fate of unmodified Nature rests in the activity of its friends. If they continue to be too busy or too indifferent to unite in its defense, then the universe of the wilderness is doomed to early extinction. If, on the other hand, they believe that its preservation is worth the sacrifice of some precious time and energy, and if they will take the trouble to become vociferous, there is no reason why material areas of America should not be kept primitive forever.

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Things to Think About

The Congress has increased the number of members on the Select Committee on Government Reorganization from seven to nine in each house. Accordingly, the House has appointed Representatives James M. Mead of New York and Frank C. Kniffin of Ohio to fill the two vacancies created, and the Senate has named the following members: Senators Joseph H. Robinson of Arkansas, James F. Byrnes of South Carolina, Harry F. Byrd of Virginia, Joseph C. O'Mahoney of Wyoming, Alben W. Barkley of Kentucky, Pat Harrison of Mississippi, Charles L. McNary of Oregon, John G. Townsend, Jr., of Delaware and Robert M. LaFollette, Jr., of Wisconsin.

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The House has passed House Resolution 11, continuing the life of the special committee created in the 73rd Congress to investigate all matters pertaining to the replacement and conservation of wildlife. The Committee is instructed to report to the House not later than January 3, 1939, the results of their investigations and their recommendations for legislation.

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A Bill, H. R. 5043, granting the consent of Congress to two or more states to enter into agreements or compacts for cooperative effort and mutual assistance in the preservation of wildlife resources has been introduced by Representative William T. Byrne of New York.

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A bill providing for a permanent system of flood control, H.R. 4208, has been introduced by Representative Claude V. Parsons of Illinois.

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To provide for a survey, and the classification and conservation of the soil resources of the United States is the purpose of a bill, H.R. 4410, introduced by Representative Maury Maverick of Texas.

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Because of the recent severe floods in the Ohio and other mid-western rivers, various legislators in both Houses of Congress have introduced bills authorizing surveys, with a view to flood control, of the following major rivers: the Potomac, Arkansas, Delaware, upper Mississippi, Santee-Cooper and the Ohio.

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One of the principal wintering places for geese and ducks using the Pacific flyway has been bought by the Biological Survey. It is Spalding Ranch, located five miles south of Willows, California, and has been designated the Sacramento Migratory Waterfowl Refuge. The new refuge, comprising 10,775 acres, "is small compared with some other sanctuaries being set up by the Biological Survey in the national program of waterfowl restoration," but officials regard the area as important because of its strategic location. Since it is naturally attractive to waterfowl, the Survey plans but little development work on the area, although small dams, dikes and levees will be constructed to impound water from spring run-offs from higher land. Among the birds that will benefit particularly by this refuge is the cackling goose, a small species that breeds in a limited area in northwestern Alaska and now winters chiefly in the Tule Lake and Sacramento sections.

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The Roadside Improvement Committee of the Federated Garden Clubs of Michigan have drawn up a bill to be presented to their state legislature designed to curb indiscriminate roadside advertising. It is hoped this original draft may serve as a suggestion to other states, and it is urged that similar organizations throughout the country write to W. Woodbridge Dickinson, chairman of the Roadside Improvement Committee, 209 North Walnut Street, Lansing, for a mimeographed copy of the bill for purposes of study.

The bill does not propose to eliminate roadside advertising; it is merely a regulatory measure designed to prevent abuses and to clean up roadsides. The measure would make possible the creation of scenic zone highways and scenic zones on commercial highways, and would prohibit signs within fifty feet of the right of way and within 500 feet of a highway or railroad crossing. Since it is very temperate, the measure will probably escape active outdoor advertising industry opposition.

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Under a ruling of the Virginia Alcoholic Beverage Control Board all types of outdoor advertising of alcoholic beverages is prohibited. This applies equally to billboards and exterior signs on places of business. While the Board is not concerned with the restrictions of billboards, this ruling does affect them materially.

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In the interests of safety and appearances, the County Commissioners of Spokane County, Washington, have passed an ordinance requiring permits for all structures within 300 feet of the center line of all main highways. Permits are granted only when the proposed structures are deemed in the public interest. A second ordinance licenses billboard companies and requires a fee for each board. It also prohibits signs within 300 feet of an intersection, or public park, forest or playground.

In our December, 1936, issue, in the article entitled "Rodents and Conservation", Dr. Charles T. Vorhies levelled criticism against the Department of the Interior for certain questionable rodent control projects on the public domain. Secretary Ickes writes with respect to the background of these projects:

I believe you will be interested to know that when the rodent control projects to which you refer were first proposed, I questioned their efficacy. In order that I might secure the best scientific advice available, I called a conference of representatives of the Grazing Division, the Wildlife Division of the National Park Service, both of this Department, and of the Biological Survey of the Department of Agriculture. The biologists of my own Department recommended that the projects be not undertaken. The representatives of the Biological Survey, on the other hand, stressed their belief that the proposed rodent control measures were feasible and desirable. After considerable discussion of the problem, I stated that since the Biological Survey had long been considered the Federal authority in such matters, I did not see how we could refuse to accept its advice. The projects were authorized, then, in conformity with the best biological advice obtainable from the Department of Agriculture.

Being ourselves convinced that, in many cases, the rodent and predator control activities of the Biological Survey arise from a desire to perpetuate jobs rather than from any scientific or economic justification, we are glad to print the above clarification in this instance.

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Legislation is pending before the Ohio Legislature to remove the quail from the "song bird list" and start shooting it again. The old and scientifically disproved argument that coveys must be shot up and scattered to prevent inbreeding is again in full cry.

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A 4428-acre tract in the Illinois River bottoms in Mason county, Illinois, has been set apart by an Executive Order of Dec. 23, 1936 (No. 7524) as the Chautauqua Migratory Waterfowl Refuge, and is being restored by the Bureau of Biological Survey for the use of wild ducks and geese that have made it one of their principal stopping places on the Mississippi flyway. The rebuilding of the levee and spillways is stabilizing the water level and encouraging the growth of various food plants necessary for the restoration of migratory waterfowl. This refuge lies about halfway between two other important concentration areas on the Mississippi flyway—the upper Mississippi Wildlife and Fish Refuge, and the White River Migratory Waterfowl Refuge in Arkansas.

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The Massachusetts Billboard Law Defense Committee has drafted a model by-law for towns in the Bay State enabling them to carry the State law into effect. This ordinance is of interest to people outside Massachusetts, also. The address of the Committee is 3 Joy Street, Boston.

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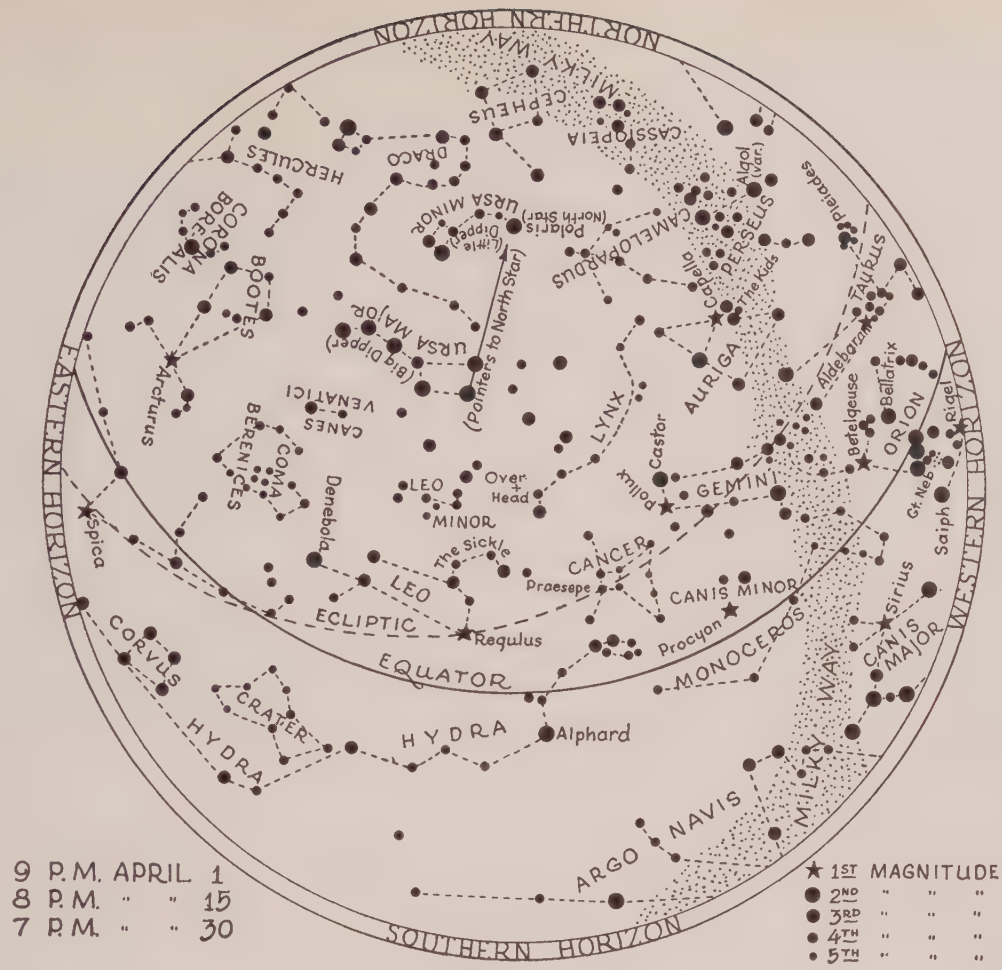
"Ducks Unlimited"

(Continued from page 234)

The part shown on the More Game Birds map, south of the Canadian line, which never has produced more than a small proportion of the birds, is now largely eliminated from consideration by drought and settlement; and the part shown south of the dotted line is subject to serious limitations as mentioned by More Game Birds in its discussion of percentages. This dotted line, which marks the northern limit of sport shooting, is seen to be virtually the line given by More Game Birds as marking the northern limit of thirteen percent of duck production. This line, it so happens, is also the northern limit of intensive settlement and agriculture. The rest of the vast breeding range to the northward is therefore the area that produces the 82 percent that More Game Birds would crowd into its cross-hatched area, and on which it proposes to spend the vast sums that it hopes to raise. The error of thus limiting the duck factory to this small area arises, we suspect, from the fact that this is the only part of the vast north that has been visited by More Game Birds, and from its refusal to consult any other authority but its own.

But the ducks mentioned (the same statement applies to all our geese) do not now breed in the vast region that stretches north to the Arctic coast and northwestward to Alaska because they were recently driven there. They had been there for centuries when Hearne and Mackenzie and the pioneers of the fur-trading companies first explored the country between 1772 and 1800; they were scarcely diminished when Kennicott and MacFarlane, and other ornithological explorers of the Smithsonian Institution studied them in 1860; they were there, though reduced, in 1900 when the Biological Survey first sent its naturalists to the region. And they still nest in all this region in such sadly limited numbers as the gunners of the United States have permitted to return for breeding.

All this is no secret that we are just now revealing. It has long been spread over many pages, that all may read. And yet, while America's last waterfowl species are fighting for their very existence, this organization, which has sponsored nearly every method to increase game except less killing, launches this program to "restore" breeding on a few hundred square miles of country that now lacks nothing for the happiness of waterfowl but adequate breeding stock. The movement is staged in Washington, a section intimately known to M. G. B. officials. Washington is not a duck-hunting region, but it is the area where laws and regulations governing duck destruction are formulated, and where hearings before Congressional committees are staged. And this fact, we suspect, has governed the Foundation in its choice of a battleground. As this is written we hear rumors of attempts to liberalize shooting regulations by Congressional action, and we wonder if the conservationists of America will do their duty by the ducks, or snatch at this latest red herring.



April—Mercury and the Zodiacal Light

By ISABEL M. LEWIS

MERCURY is always playing hide and seek with the star-gazer unless he knows just where and when to look for it. Even if seen by chance this small planet will not be recognized unless one is familiar with its orbit. The eastern elongation that occurs in April brings the planet into favorable position, for at this time the ecliptic —Mercury as well as all the other planets lies near the ecliptic—rises most sharply from the western horizon and the planet appears at a higher altitude above it. Those who have never viewed Mercury should welcome this opportunity to see it at its best, as it will be more favorably placed this month than at any other time during the year. Although the greatest elongation occurs on April 19, when the planet will be twenty degrees east of the sun at sunset, one may be fortunate enough, with nearby Venus as a guide-post, to pick it up low in the west as early as the evening of April 7.

These two planets will be in conjunction on the morning of April 7, but by evening Mercury will be a degree or more east and about six degrees south of its neighbor. With Venus as a guide, however, it may possibly be discerned immediately after sunset. The fact that it will be as bright as Sirius, the Dog-star, will make it more easily found. As the altitude of the planet above the horizon increases as the time of greatest elongation approaches, it will be easier to find at this time. On April 12, Mercury will be in conjunction with the thin crescent moon, but will not be visible in the United States until somewhat later, when one should look for it several degrees southwest of our satellite. By that time, Mercury will have decreased considerably in brightness, although it still will be brighter than any of the stars except Sirius and Canopus. It will continue to dim rapidly until, on April 19, it will match the brilliance of Arcturus, or Vega. By April 25, it will be no brighter than Regulus. This sudden fading may seem strange at first thought, especially since the planet is about 108 million miles from the earth on April 7 and 70 million miles away on April 25, but the loss in brightness is due to the change in the phase of the planet. It resembles the gibbous moon on April 7, a half-moon at its greatest elongation on April 19, and crescent moon after that date, when it becomes thinner and thinner, disappearing entirely at inferior conjunction, when its phase corresponds to that of the new moon. The brightness

of Mercury depends on the amount of illuminated surface (as well as its distance from the earth) and this is greatest when the planet is gibbous, several weeks before elongation. The planet is then too close to the sun to be seen after sunset, but it may be viewed telescopically in the daytime.

On April 19, as well as a few days before and after that date, look for the planet a little north of west about half an hour after sunset, when its altitude will be less than twenty degrees. Although planets are supposed to be distinguishable from stars by the fact that they do not twinkle, this is not true when a planet lies near the horizon and is seen through dense layers of the earth's atmosphere. Mercury, in fact, never seen at a great distance above the horizon, often was called "The Twinkler" by the ancients. Its color, like that of the sun and moon, becomes reddish when the atmosphere is particularly dense or hazy. Normally, it is a light yellow color.

It is necessary to resort to superlatives when describing Mercury, for this little world is the smallest, with the possible exception of Pluto, whose size is unknown; the hottest; the nearest to the sun; the swiftest of all the planets, and, we might add, the most difficult to find. It is observed to better advantage in the southern hemisphere, as its greatest possible elongation—thirty degrees —occurs when the planet is south of the Equator. At the most favorable elongations in the northern hemisphere it is never more than twenty degrees from the sun.

April also is the best time of year to watch for the zodiacal light, a hazy wedge-shaped beam extending from the western horizon upward along the ecliptic. Its base is about fifteen or twenty degrees wide and in the brightest portions is two or three times as bright as the Milky Way. Since it cannot be seen in the presence of moonlight, one should look for it this month before the appearance of the crescent moon on April 12. The zodiacal light is seen to best advantage in the Tropics as it rises nearly vertically from the horizon, the twilight duration is short, and it therefore can be seen soon after sunset. The phenomenon is believed to result from the reflection of sunlight from myriads of small meteoric particles lying in the plane of the ecliptic and extending beyond the orbit of the earth. A similar beam of light can be seen before sunrise, when it is best observed in the fall. Within the tropic zone these two beams meet and extend entirely around the ecliptic, forming what is known as the zodiacal band. Exactly opposite to the sun is a brighter patch in the band known as the Gegenschein. Two new theories regarding the light are that it is due to an atmospheric phenomenon at great altitude and that the earth has a sort of luminous tail like that of a comet due to light pressure from the sun. As soon as twilight has faded, look for the zodiacal light along the ecliptic in the constellations of Aries, Taurus and Gemini early in April.

This month also has its meteoric shower, The Lyrids, seen in greatest numbers April 21. Meteors belonging to this shower usually are observed for about four days, the average hourly number seen by one observer during maximum display being about seven. As the name implies, they come from the direction of the constellation of Lyra, and are swiftly moving as they are met "head on" by the earth in the early morning hours. The greatest meteoric showers occur in the second half of the year when the number that appears, on the average, is about twice as great as the number observed in the winter, spring and early summer. This may be due largely to the great shower of the Perseids that lasts for some time in July and August and exceeds all others in numbers.

Venus, which has been a magnificent object throughout the fall, winter and early spring, is visible low in the west but only for a short period early in the month. It will be in inferior conjunction with the sun on April 17 and then it passes to the morning sky, where it will be too close to the sun to be seen as a morning star until next month.

Jupiter will be in quadrature with the sun April 16 when it rises at midnight and is visible the remainder of the night in Sagittarius. On that date it will be on the meridian due south at sunrise.

Mars is approaching opposition and steadily increasing in brightness. It will nearly equal Sirius by the end of the month and will be as bright as Jupiter at opposition in May. It rises before midnight and can be viewed most of the night in the constellation of Scorpio a few degrees northwest of Antares.

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THE MAY FLY

By SAMUEL A. HARPER

The world of time means naught to you,
A child of timeless space.
Your wisdom brings the flush of shame
To my earth-troubled face.

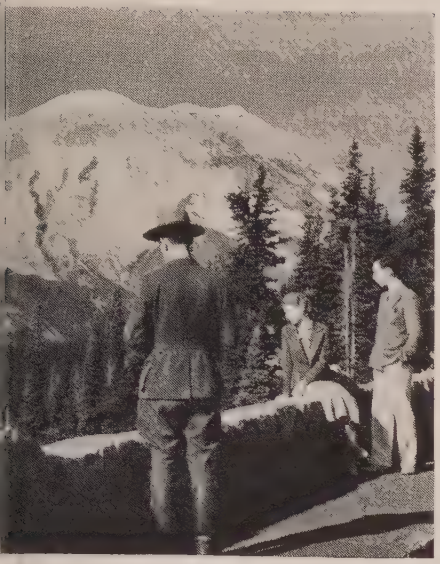
For you were born of fiery sun,
Among the kindred stars,
In whose warm light content to live
Above earth's bridling bars.

For you enough to find the light
That circles round the spheres,
While I go stumbling down the dark,
Encumbered with the years.

For you it is enough to shine
As brightly as you may
In Nature's endless pageantry
That floods the cosmic day.

So thanks to you my little friend.
Your brief span teaches me
That life among the kindred stars
Is our eternity.

"Highlight of my Trip"



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PHOTOGRAPHIC NOTES

(Continued from page 196)

jecting color transparencies has just been announced by the Eastman Kodak Co., Rochester, N. Y. If you own a miniature camera, you will be interested in this latest item. A note to the manufacturers will bring literature with full information.

Photography and the Art of Seeing, by Marcel Natkin. Camera Craft Publishing Co., 425 Bush St., San Francisco, Calif. Price $3.50.

The pictorial photographer's greatest asset is being able to "see" a picture. He must immediately be able to recognize possibilities in a scene, he should know the basic rules of composition, the use of curves and triangles in the picture area, etc. In *Photography and the Art of Seeing,* the author has approached closest to imparting, by word and illustration, these qualities to the mind of the reader. Each one of the thirty illustrations is a beautiful example of the photographers' art and the text contains the vital information that makes a picture live. An essential addition to the aspiring pictorialist's library.

As I Remember, by Arnold Genthe, Reynald and Hitchcock, Inc., 386 Fourth Ave., New York, N. Y., 290 pages, 64 pages of photographs, price $5.00.

As I Remember is the brilliant narrative of Arnold Genthe's life and his career. The story begins with Genthe's boyhood in Germany, his education and his final settlement in San Francisco where he embarked on a photographic career. By introducing a new technique in portraiture he quickly made a reputation for himself which drew the famous from every part of the world to his studio. The illustrations include some of Genthe's finest work. Portraits of artists and presidents and scenes from the tragic San Francisco fire to the peaceful landscapes of Spain and Japan carry the reader through a colorful and kaleidoscopic existence. Arnold Genthe's claim to greatness was long ago established by his photographs; *As I Remember* establishes his claim to immortality.

Ski and Camera, by Dr. Paul Wolff, published by The Ruthenberg Color Photography Co., 4961 Sunset Boulevard, Hollywood, Calif., price $3.00.

I am always pleased when I hear of a new book by Dr. Paul Wolff. In Dr. Wolff's *Ski and Camera* he has presented an unusually charming set of snow pictures. That subtle quality that "makes a picture" can be found in every one of Dr. Wolff's photographs. From the city streets to snow covered mountains; from the ski-jump to hockey game, each picture leaves a beautiful memory. *Ski and Camera* in your library will prove a joy forever.

The photographic department of NATURE MAGAZINE is devoted to its readers interested in photography and maintains a service which renders assistance with any photographic matter. You are invited to take advantage of this service. Address all photographic inquiries to Samuel Brown, NATURE MAGAZINE, 1214 Sixteenth St., N. W., Washington, D. C.

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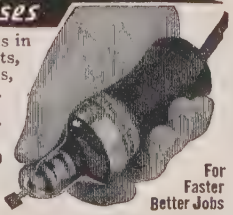

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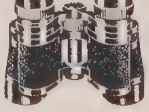

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Hiking and Camping Forum

Conducted by
ERNEST A. DENCH

Hiking and camping inquiries will be answered by mail if a stamped, addressed envelope is enclosed. Address the Forum editor.

Copies of the following Forum service publications are still available from association headquarters at the single copy price named: ***Cookery in Camp and on the Trail*** (A Compilation of Sources of Information), 10 cents; ***Let It Rain*** (Clothing and Equipment Suggestions and Listings), 10 cents; ***Pestiferous Months Ahead*** (Remedies and Antidotes), 3 cents; ***Gadget Lists,*** any month or months, 3 cents each.

April Gadget List

1. The Forum editor has a projecting forehead, and any hard or stiff hat gives him a headache. As there are other masculine hikers and campers in the same boat, he recommends a smart beret (your own choice of colors) of Continental origin, but procurable here. Neither the leather sweat band nor the satin lining is soaked after a rainy day trip; but the beret, being of wool, shrinks after exposure to rain, so a size or two larger is advisable.

2. An Adirondack pack basket, 18" size, made by the St. Regis Indians and distributed by a Saranac Lake firm, has come in mighty handy on Forum camp cookery experimental trips in toting *bulky* rather than *heavy* loads of foodstuffs—difficult to stow inside a large knapsack in conjunction with other supplies. This lightweight basket (in 4 available sizes) is shaped to fit comfortably against the back. It has adjustable canvas shoulder straps.

3. A modern replica of the comfortable slipper, as supposed to be worn by ancient Vikings, is the novelty of a New England shoe firm. It is the moccasin style with heels and easy to slip on and off. Suitable for wear about camp.

4. A new liquid coffee was served in a twinkling (after the water boiled) as a late evening snack on a Forum trip. While it is not equal in aroma or flavor to regular coffee, it is a *good* prepared or instant type of Java. Claimed to keep its flavor indefinitely. The syrup is packed in 4 and 6 oz. bottles.

5. A new fire accelerator comes in a sausage-like roll, made up of five individual capsules. Same firm also has an inexpensive road flare, adaptable as an emergency light in camp after dark.

6. The latest example of the paper maker's ingenuity is a handle cup for hot beverages. The finger hollow on the handle is a tight fit for the fellow with thick fingers.

7. A new aluminum picnic set reflects the designer's resourcefulness. Visualize, if you can, five pans, each of 2½ quart capacity, fitting over one another, and securely held

gether by two metal straps with a carrying andle. With this simplified set you can semble the picnic meal at home in orderly urses and serve them that way. The pans, hich are without projecting handles, lend emselves to camp cookery operations, in ddition.

8. A New York firm offers a line of water-oofed but washable hats—two straws and ree softs. The two straws (which includes e Panama type) are featherweights, and erefore suited to warm weather trips. As e hat is washable, the grime can be re-oved after each hike.

There are some especially good items mong the foregoing for the hiker, camper d picnicker on spring and summer trips. he essential additional information needed yours by writing the Forum editor, asking r the *April Gadget List,* and enclosing a amped, addressed envelope.

Map Service Aids

A reader's question: My U. S. Geological urvey maps wear out quickly through fre-uent use on trail trips. I haven't the time r the inclination to mount them. Do you now of anybody performing such a service r a moderate charge?

Forum editor's answer: Mounted map rvice is offered by the Empire Map Spe-alties, Inc., 442 Gurney Bldg., Syracuse, . Y. As specimens of their work, they bmit two Adirondack sheets, folding in 4" x 6" sections, with State Conservation epartment trails reproduced in the same lors as the linoleum disc markers. This m also makes all kinds of maps to order. Federal maps in the same size folds, ounted on muslin, and varnished to make em waterproof, are available to order from . C. Hadley, Shelburne Falls, Mass. Each ap is enclosed in moss-green, durable vers.

The Dollar Sign Foremost

Before the American Youth Hostels, In-orporated, will establish a loop of hostels n any section of the country, the local spon-ors are required to finance the salary and xpenses of a field man for one year. Such ld workers are given a preliminary train-g course at Northfield, Mass., headquarters. s is done to ensure the new hostels being nducted on the high ideals for which the H movement stands.

The Adirondack Mountain Club is con-ering a proposal to engage a professional ublicity expert or advertising agency to lace its financial white elephant, John rooks Lodge, on a paying basis.

The Appalachian Mountain Club took a alf page advertisement, at regular space tes, in the current American Ski Annual, attract more winter week-end guests to s Pinkham Notch Camp.

Campfire Meal For a Special Occasion

Any good excuse, be it a friend's birth-ay or a family anniversary, is sufficient to et plans in motion for a sumptuous camp-re meal.

The Forum editor and his camp cookery rip associates celebrated the first birthday f such experimentations by experimenting

(Continued on page 249)

"FRIENDLY AMERICA"
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As President Roosevelt said in his radio broadcast from Glacier National Park, on August 5, 1934:—"If our American national parks were to be set down anywhere on the continent of Europe, thousands of Americans would journey all the way across the ocean in order to see their beauties." Fortunately, the Rocky Mountain States and the Pacific Coast contain not only glorious national parks but in addition every other vacation attraction—from dude ranches to glamorous society resorts.

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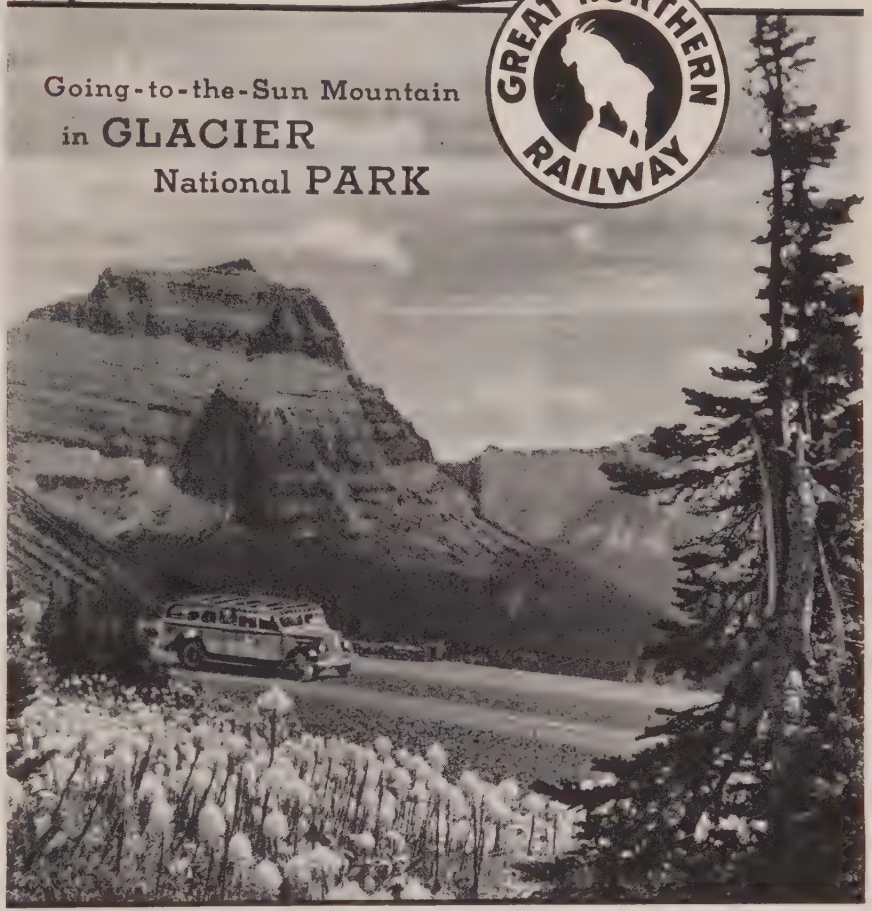

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Nature Magazine in School

A Department of Aid to the Teacher

In order that teachers and parents may further use Nature Magazine as an aid to the study of Nature and Science, this page is devoted to the following brief notes based upon articles in this issue and suggesting ways in which they may be used as a source of inspiration and information. To bring these Nature study thoughts to our readers we have obtained the services of one eminently qualified for the task, and this department is edited

BY ESTHER SCOTT

Instructor in charge of Elementary Science
Washington, D. C., Schools

Unlocking the Past in the Canadian Rockies

Both the text and the pictures of this article would be very useful in teaching a unit dealing with geology. The outline of topics about which the article is written might also serve as an outline for the topics in such a unit.

Prehistoric animals make a good introduction to the story of the formation of the earth. Reading and telling stories, drawing pictures, and modeling dinosaurs are activities that help to interest pupils in these ancient forms. Such questions as these: How do people know that these animals lived a long time ago? How long ago? Why did all of them die? are leads into a study of geological and biological problems. Since the age of fossils is determined by the types of rock in which they are imbedded, as well as the type and thickness of the layers that overlie them, the answer to a question as to the age of fossils leads to an investigation of the kinds of rocks, the types of formation and the subsequent erosion. In this connection two references that are of special interest to younger pupils are the *Earth for Sam* by Maxwell Reed and the *Story of the Earth* by Carlton Washburn.

More Than Mere Insects

This is an article that would be most useful in dealing with superstitions. One mode of attack on these false beliefs is to have pupils make up lists of queer notions, and then to try to establish by observation that they are false. For instance the belief that an impending state of war is indicated by the W on the wing of the seventeen-year locust might be questioned by the comparison of dates of actual wars and the appearance of the cicada. In order to appreciate that things involving two alternatives happen by chance on about a fifty-fifty basis, some teachers tell their pupils to throw up a coin and count the number of times that heads and tails come uppermost.

Snakes That "Play Possum"

Superstitions and senseless fears about harmless snakes mar many a Nature hike and prevent some persons from venturing on a leisurely ramble through tall grass. After one has grown up it is not easy to overcome this feeling, but children's fears are not so deep-rooted. The outlook of the latter toward reptiles may be changed by one well-chosen visitor to the classroom, such as the harmless hog nosed snake or the gentle little garter snake.

After the teacher and braver members of the class have picked up the snake, many others will clamor for an opportunity to hold him. When they gather enough courage to do this, the fear of the snake is becoming a thing of the past. If the reptile can remain in the classroom for a few days, more confidence is gained. An old aquarium may be fitted up as a terrarium, by using a layer of moist soil covered with moss on the bottom, a dish of water and several pieces of old bark, stones or other material under which the inmate of the terrarium may hide.

On the other hand, the fact that there are such things as poisonous snakes that are dangerous should be taught. Pupils should know how to distinguish the dangerous species by their triangular heads, decidedly broader than the adjoining body, and the significant pit between the eye and the nostril. For most of the country these marks are sufficient.

Mercury and the Zodiacal Light

Since this month the zodiacal light, the Lyrids, as well as Mercury and Venus, are visible, an outdoor star party might be arranged. In preparation for such an expedition, this article gives excellent material for background reading, as would also the book entitled *Astronomy for Young Folks* written by Mrs. Lewis especially for young persons. Before going on the trip, each member of the class might make a map of the sky, putting in important landmarks such as the big dipper, the north star and Orion. They could learn the meaning of such words as horizon, equator and zenith, and read up on the zodiacal light and the Lyrids. At the time of the star-gazing party, the pupils themselves might do the actual teaching, different ones being responsible for the several subjects to be presented. In addition to pointing out constellations, planets, shooting stars and the zodiacal light, myths concerning the constellations could be told as a climax to the outdoor lesson.

Saving the Bighorn and the Ivory-bill

First aid for vanishing desert mountain sheep and the ivory-billed woodpecker is announced by John H. Baker, Executive Director of the National Association of Audubon Societies. With the cooperation of the University of Arizona, the first of a series of Audubon research fellowships has been set up to determine ways and means of preserving and restoring the desert bighorn, a magnificent animal now reduced to pitiful remnants in isolated ranges of the southwest. Supervision and direction of this wor will be in the hands of Professor Charles T Vorhies, economic zoologist of the Unive sity. Offers of full cooperation have com from the United States Forest Service, th Biological Survey and the Arizona Fish an Game Commission. Mr. A. A. Nichol wi carry on the field work as a basis for Ph.D. degree.

Wings in the Blue

Edwin A. Boardman is the author of book of poems with the above title tha should appeal to all lovers of Nature, pa ticularly lovers of bird life. A conservatio ist, Mr. Boardman has an intimat knowledge of his subject, gained by man years of experience in the outdoors. H poems cover the many aspects of the lov liness of bird life under varying conditions— on the stormy sea coast, in the nestin grounds of the north, in the mountain fas ness of the eagle's home. Another lover o wildlife, Frank W. Benson, has illustrate the book with five etchings that are exce lently expressive of the thought in the poe they accompany. The Christopher Publishin House, Boston, is the publisher and the boo sells for two dollars.

Nature Adventures

The opportunity for exploring far-o lands comes to but few of us, but there ar many frontiers just outside our doors tha cry out for the exploring footstep. On thes frontiers every citizen may become an ad venturer, writes Mary C. Butler in he *Happy Nature Adventures*. Her own lif became so enriched by her Nature exper ences and observations, all of which too place no more than eight miles from he home, that she set them down in book form for the benefit of others. As a result of he new found happiness, the author has sug gested a tenth Beatitude: "Blessed is th person who has learned to treasure the sma happy adventures, for of such is the King dom of Contentment." The book is avai able from Dorrance and Company, pub lishers, Philadelphia.

Knowing Trees by the Twigs

The New York State College of Forestr announces the publication of a mimeograph ed pamphlet entitled *Twig Key to Som Common Northeastern Trees*. Written i non-technical language, the booklet shoul prove useful to Nature clubs, Boy and Gi Scout groups, 4-H Clubs and the like. Sing copies are 25 cents; ten or more, 20 cent 100 or more, 15 cents; or 500 for 10 cen each. Write to W. M. Harlow, author an publisher, in care of the College, Syracus N. Y.

HIKING AND CAMPING

(Continued from page 247)

to the limit! And the casualties were nil; in fact, several of the experimenters have been on *all* trips—proof that the so-called Inner Man has fared quite well.

The first item to be served on this breakfast menu was a canned orange of the ripe tangerine type, in peeled quarters, liberally soaked in juice, and of Oriental origin. Each breakfaster was served a 5-ounce can. This canned fruit deserved the favorable reception it received.

Following this was a popular hot wheat cereal, served in waterproofed "banana split" shaped paper containers (to cut down the dish-washing) with fresh milk and sugar.

Soon the ham and eggs were ready. The eggs, quite ordinary hen fruit, were scrambled. The meat, a pre-cooked branded ham from Poland, comes in different size cans, and is tender, mild and fairly lean. Slices of the ham were *slightly* fried over a charcoal fire. The frying was done more to heat the ham than cook it on a cold morning.

Meanwhile our expert woman baker was having quite an easy time of it making biscuits with a prepared mix and baking a batch every few minutes in a reflector oven placed a short distance away from the big campfire. This lady is no guesser about temperatures, even outdoors; for she had carried an oven thermometer from home. She had that oven registering 300 degrees before she inserted the dough circles, and the fire attendants did the rest, by intensifying the heat of the logs to between 400 and 425 degrees.

Instead of butter a new non-fattening spread, much more expensive than butter, was used. In case some might be prejudiced, nothing was said in advance about the spread. As no comments favorable or otherwise were heard, it must have tasted like butter. It is packed in a tight circular parchment drum, protected in an outer carton, and should carry well on long-distance trips.

The ham, eggs and hot biscuits were served on a blue plate platter of waterproofed paper.

The Sweet Toothers, at the meal's end, had access to jars of a ginger marmalade put out by an old-established Boston firm. It is a rich blend of orange jelly and preserved ginger. And, of course, there was a choice of coffee and tea, two new brands of which were used.

Write the Forum editor, enclosing a self-addressed, stamped envelope, and the current month's *Gadget List,* giving the essential information as to the names and sources of supply of these products, will be promptly sent you.

On Flower Arranging

Modernistic Flower Arranging, by Barbara Sagel Meisse, deals with the modernistic phase of the subject as developed by modernistic thought. No matter whether your garden be large or small or whether you gather your flowers in the field or purchase at the florist, this book will show you how to get the best effect with the minimum of flower material. The book, beautifully illustrated with thirty-two full page plates, is available from the publishers, Orange Judd Company, New York City, for $2.00.

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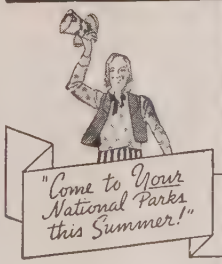

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SAMUEL N. SPRING, *Dean*

THE WHY OF CAMPING

By Burke Edwards

Director, Camp Service Department

What is the essence of camping? A great many parents do not know and for this reason refrain from sending their children to summer camps. They feel that their son or daughter gets just as good, if not better, food at home and that he or she can romp and play there as well as at a camp. Many fathers and mothers mistakenly believe that home comforts are vastly superior to anything that a camp can give.

These parents should turn about and have a look at themselves. They do not meet in clubs, dinner parties and the like because of the comforts of the meeting place or the quality of the food. They meet for the pleasures derived from the comradeship of their peers. This association, added to the glorious freedom that naturally comes in the great outdoors, is the real gist of the summer camp. Camp life teaches young people self-reliance. The new-found freedom develops initiative and adds to the joy of living—particularly when there is no meddling on the part of grown-ups. What banquet could be as delicious as a steak cooked over the campfire, even if it should be scorched black? It is delicious because it is flavored with the spice of independence; because the child, in gathering the wood for the fire, spearing his supper on a stick, holding it in the blaze until done, was doing something for himself.

Many parents may feel that they could not bear to be separated from their children or give them into the care of others for the summer months. The stronger this feeling, the more important it is that they should be given a vacation from one another, even if only for a few short weeks. Although parents rely on teachers to instruct their children in their ABC's, on doctors to cure them of their ills, some do not continue this logical chain of reasoning when considering the child's physical development, his need for instruction in meeting and working with associates and the desirability that he does not lead too easy a home life during the summer vacation from school.

Camping joys result from what one does for the others, not in what fellow-campers do for one. There is no joy equal to making someone else happy; every camper learns that the first day. This principle is taught to some extent at home and in school, but never so effectively as it is at camp. It is there that the young camper must learn to adapt himself, to "fit in," and to learn how to make friends. That is the keynote of camping—to learn to get along with your companions. The sooner this is learned the easier will be life's pathway.

The parent should not judge the matter from the point of view of the comforts, the sports or the climate of the camps. If he weighs the value of his personal care with those received at camps, he is still on the wrong track. He is selfish if he decides not to send his child to camp because of his own loss of companionship. Wise parents prize their children's comradeship and count the days they are away from home, but they do not deprive their son or daughter of a camp's innumerable benefits.

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Audubon Fellowship

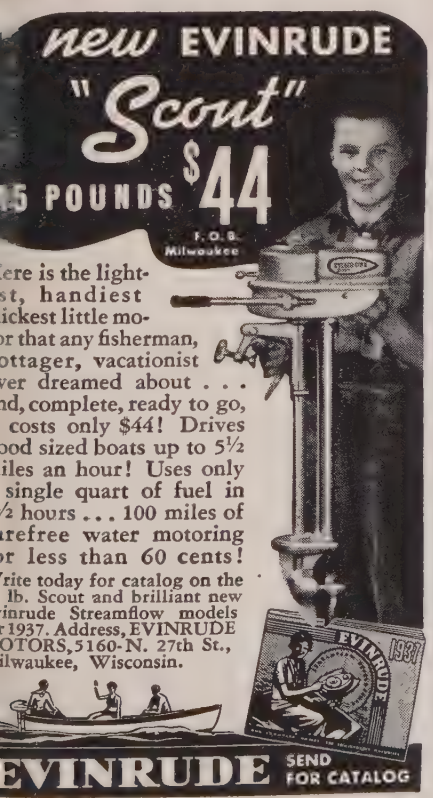
An Audubon fellowship has been established at Cornell University, New York, to determine methods of preserving the ivory-bill. Complete inventory of the birds of this species will be made as will a detailed study of the effect of all elements of the environment of the birds. Dr. Arthur A. Allen, professor of ornithology, will direct this work, and Mr. James Tanner has been appointed to the fellowship.

Chimney Swift Banding

The December issue of *The Migrant*, quarterly journal of the Tennessee Ornithological Society, contains an interesting article by Ben B. Coffey, Jr., on chimney swift migration at Memphis. Some of the birds banded by the Society at this city have been reported as far away as North Auburn, Maine, a distance of about 1200 miles. Membership in the Society is invited, but only from those who by reason of their scientific inclinations and inborn love of birds and Nature will sustain in their interests and forward the work of the Society. The roster numbers 150 active members in the State and fifty Corresponding members in neighboring states. Those interested can obtain further information from Albert F. Ganier, 2507 Ashwood Ave., Nashville.

Veterans' Sanctuaries

According to information received from the Veterans' Administration, most of the reservations upon which are located the Veterans' Administration's hospitals are to become sanctuaries for birds and other wildlife. General Frank T. Hines, Administrator, reports that the manager of each hospital and home has received instructions to study methods by which the conservation of birds, fish and other wildlife on the reservations can be effected. The work is to be carried forward in cooperation with the Biological Survey.



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Duplicate prizes will be awarded in case of a tie. The decisions of the judges, appointed by the National Garden Guide, will be final. Your Garden Contest Entry Blank can be obtained from any of the horticultural advertisers below, or from the Garden Contest Director of Nature Magazine, 1214 Sixteenth Street, N. W., Washington, D. C.

On the blank you will find space to mount the photograph of your garden and to write not more than 200 words of description about it. The only requirements for entry in this Garden Contest are (1) that you write in for your blank not later than June 1st, 1937, and (2) that you return it to us with your garden photograph and information about your garden not later than September 1st, 1937, the date on which the contest closes.

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A SHORT STORY OF THE SWEET PEA

(Continued from page 212)

There are several traditions connected wit growing sweet peas, such as planting th seed on St. Patrick's Day or Good Friday. more recent one is to plant the seed o Thanksgiving. Most traditions are local i origin, and therefore, when they are hear must be thought of as such. It is impossibl to set one planting date that would appl to all of the United States. In New Englan and other northern states, where the sprin season is long and cool, the seed should b sown in the spring as soon as the ground dry enough to work. In the group of stat that can for convenience, include all tho south of New York, the spring is short an hot, and, therefore, better results are obtaine by planting the seed in the fall, two weeks b fore the ground freezes in the coldest state or just before the coldest season in the other The early flowering type is recommended fo the southern states and frost-free states, als for earliest blossoming outdoors in th North, and, of course, for winter bloomin under glass. Before the ground freezes, th seed germinates and forms roots, but col weather should stop growth before the shoot begin to appear above the ground. The im portant thing in growing sweet peas is t develop good root systems that will be abl to take in sufficient water for the vine durin warm weather.

Soil conditions, of course, are also impor ant in developing healthy plants. For swee peas there is nothing better than a light so containing a goodly amount of barnyar manure and bone meal. But sweet peas ca be overfed, and if the soil in which they ar growing is fertilized each year, the vines wil reward you for your labor, but not the flow ers, for these will drop off before they oper This will always happen when there is to much nitrogen available in the soil.

Another mistake that well meaning gar deners make is to provide the vines with nice-looking sturdy wire fence on which i can climb. It does give grand support durin cool weather, but in the middle of a warn day when the sun beats down the wire get hot, as all metal does, and as the sweet pe cannot take its tendrils off the wire, its finger get burned, so to speak. There is nothin better than string stretched between poles o good spreading brush.

In many ways plants can be thought of a human beings. Young children are not fe rich food or exposed to extreme weather con ditions and neither should we do this wit seedlings. Unfortunately, plants seem also t be temperamental. In some places, they jus won't grow no matter what is done for them because the climate is not suitable, but on type or another of sweat pea can be grow anywhere in the United States at differen times of the year, thanks to the patience an work of plant breeders. A great deal of credi must go to them for developing the swee pea into the charming, much loved spray o beauty that it is.

Earliest Fish Exhibit

Fossil scales of the earliest known fishes which lived about five hundred million year ago, are on display at the Field Museum o Natural History, Chicago.

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Banding Enthusiasts—Attention!

From Richard H. Pough of the National Association of Audubon Societies, New York, comes a plea for cooperation on the part of readers of NATURE MAGAZINE in a project designed to increase our knowledge of hawks through banding. If hawks and owls are to be banded in significant numbers, hundreds of field observers are necessary to band the nestlings. Handicapped by lack of funds, the bird-banding division of the Biological Survey cannot issue regular banding permits to the number of people who might be able to assist in this valuable work. Mr. Pough, however, has been given a permit and bands for all sizes of hawks, and he asks that we urge our members to write to him for bands that they can place on birds this spring. In doing so, specify species found in your neighborhood so the correct size can be furnished. A card accompanies each band that is returned to Mr. Pough when each bird is banded, and he in turn clears all records with the Survey when a return is recorded. Mr. Pough's request will be a good test of the willingness of the amateur bird man to make the effort necessary to advance a branch of ornithological knowledge through cooperative effort. Address Mr. Pough at the N.A.A.S., 1775 Broadway, New York City.

Free Plans for Bird Houses

The Burroughs Nature Club of Kansas City, Missouri, will be pleased to send free illustrated plans for making bluebird houses, the only requirement being that you send a self-addressed, stamped envelope with your request. The Nature club does not sell houses, but furnishes these "blueprints" to arouse interest in birds. At little or no cost, as many houses as is desired can be constructed from these plans. Address your communication to Harold Woodhead, Corresponding Secretary, 4934 Wyoming Street, Kansas City, Mo.

More on the Sabal Palmetto

Nature-lover James McKeown of New Smyrna, Florida, writes of his interest in Robert W. McDermid's article on the sabal palmetto, "the tree that wears boots," and adds some further facts about its usefulness, particularly to Florida youths. The small round berries, he says, are considered just the thing for pea-shooter ammunition, but those that drop on the ground make roller-skating, "a popular winter sport in Florida," rather difficult. The "boots," he adds, serve as water reservoirs, and this is "good for the tree, but they also hold water long enough for mosquitoes to breed."

New Georgia Monument

President Roosevelt has issued a proclamation establishing the Ocmulgee National Monument near Macon, Georgia, the seventieth national monument to be placed under the jurisdiction of the National Park Service. The new monument includes approximately 2000 acres rich in archeological interest and contains the most unique and important Indian mounds in the southeast, the excavation of which has thrown new light on the pre-Columbian Indian civilization of that region.

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Diana Thorne's DOG COLUMN

IN MY childhood—a doggy and horsey childhood—I used to think that if I were extremely rich some day (a thought which passed in the years from certainty to doubt, and from doubt to pessimism) that my first luxury would be to own a dog of every breed and to love each one equally.

'Pat'

Now that I am familiar with the immense number of varieties and breeds there are, I know I could not have so many and keep sane. I'd have to eliminate a few; but, NEVER the fox-terrier!

To me, he, wire-haired or smooth, has a special appeal. For him I'd walk a mile under any conditions.

All dogs are optimists by nature. But the fox-terrier carries that quality to the *nth* degree. He seems to see life through a golden haze of gaiety, merriment and good-will. It is impossible to be sad in the company of a healthy fox-terrier. He'd see to it that your blues evaporated in the least possible time. They have a wonderful sense of humor. They are the practical jokers of all dogdom. Just to look at one, to observe the mischievous glint in the eye, the twitch to the lip or the eyebrow, the lift of the whisker and the perpetual hint of laughter in his expression is enough—or should be—to know that with him life is good and many good things are sure to come!

Undoubtedly, for these qualities, the wire-hair was chosen in preference to any dog to be the light comedian in "The Thin Man" and "After the Thin Man", and to act in a rollicking movie with Ronald Colman some years ago.

The scene in "After the Thin Man", in which Asta, the terrier, chews up important evidence and eludes his captors, generally sends the audiences into near-hysterics. For me one view of any movie is enough (sometimes, regrettably, even more than enough) but by the lure of the merry Asta, I have seen "The Thin Man's" sequel several times.

I have owned many fox-terriers. Or, perhaps, they have owned me. I have written so much about them that it is invidious to say more here. Pat, however, who took periodic French leave, returned each time as he went, strictly "on his own". No lost and found advertisements or police help could trace or find him, but he always came back when he felt like it, often dirty and bedraggled, but with his tail up. He was the clown of the lot!

Terriers have always been prime favorites; and the fox-terrier has had the lion's share. His happy disposition, his gameness, compactness and adaptability make him the ideal companion for travel and for either the apartment or the country house.

The "smooth" and the "wire" are, of course, the same family. There is no difference between them except in coat, and the "wire" is a comparatively late development.

Popular through the last century, they have retained their supremacy in affection to this day. Queen Victoria had one, as did King Edward. And, as I write, I see that one has

ined chief honors in this year's West-inster Kennel Club Show.

Many years ago the fox-terrier had a de-ite duty to perform; and for this he was ed. It was his task to act as exterminator undesirables such as rats. Also, to "go, !" in fox-hunting when the hunted ani-ll took to earth and the spades were active ve him. To this day a "smooth-haired" llops with the "second-huntsman" in all cks.

But the chief job of the town dwelling k-terrier of today is to be a "good com-nion". He does this job well. He will do ything he is asked to do—except sit still long! And to do this is as hard for him for the average adolescent human who nts nothing so much as to "be on the go".

A Primer on Grasses

First Book of Grasses, treating a subject at represents the world's greatest single urce of wealth, has been prepared by Agnes ase, Senior Agrostologist, U. S. Depart-ent of Agriculture, one of our foremost udents of grasses. Soil erosion, now a na-nal problem, has called fresh attention to e importance of the study of grasses, and is hoped may aid in encouraging the devel-ment of the new profession of agrostology the intensive study of grasses with a view improving species or developing new ones meet the demands of the future. This book ens the door to this supposedly difficult bject and gives to those with little knowl-ge of botany an understanding of the struc-re of the plants that constitute Nature's eatest crop. The volume is published by . A. Silveus, 832 Cambridge Oval, San ntonio, Texas, and sells for $1.25.

No More Gentians

From Mr. George F. Norton comes word at his supply of fringed gentian seeds, giv-to readers of NATURE MAGAZINE for the dking, is temporarily exhausted. Due to the sfortune of having his field burned over fore he could harvest his second crop of eds, Mr. Norton was able to make up only 00 packets. He has made a new planting, wever, and hopes that a new supply of eds will be available by October.

West Virginia Trap Contest

The Charleston, W. Va., Humane Society offering $50 in prizes for the best humane aps entered by West Virginians in the na-nal contest sponsored by the American umane Association. Entry blanks and in-rmation can be secured from the Conserva-on Commission of West Virginia, State apitol, Charleston. The state entries do not ave to win in the national contest to be warded the state prize.

New Monument Established

A Presidential proclamation (No. 2221), stablishing Zion National Monument, Utah, as signed on January 22, 1937. The new onument comprises nearly 50,000 acres of cologically important and scenic country on e western border of Zion National Park. he monument is in wilderness condition nd without motor highways, its scenery atching that of the Park in grandeur.

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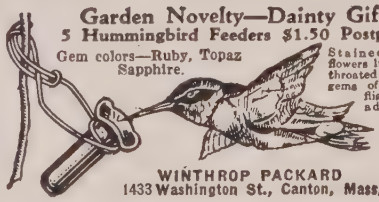
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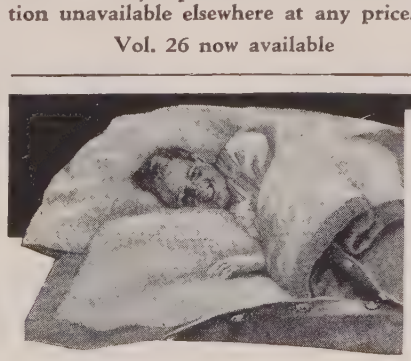

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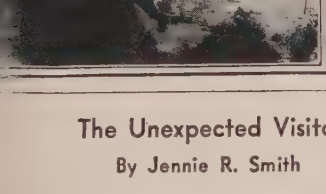

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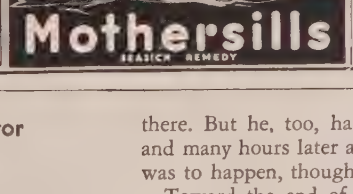

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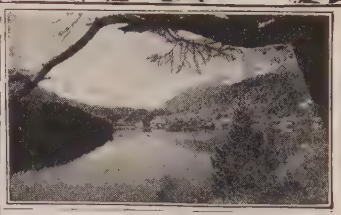

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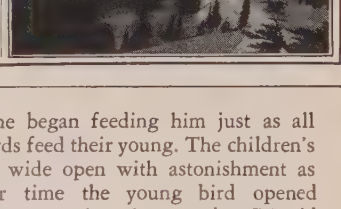

The Unexpected Visitor

By Jennie R. Smith

One bright, joyous May morning the third grade class was singing, "America", when in through the open window fluttered a tiny sparrow. Over the children's heads he flew alighting on the blackboard ledge. Surprised and interested as the children were, they continued their song.

The bird, exhausted, remained motionless, except for the blinking of his bright eyes, which seemed to say, "I'll be all right if you'll let me stay a while". It was every one's desire to assure the little visitor that he was welcome, so with subdued voices, happy smiles and light footsteps the classroom routine was carried on as usual. There was some conversation, however, as to what might be done for him should he not be able to fly again. Some thought a bird house could be made, others wanted him in the Nature Room and a few suggested the school garden if the cats could be kept away from there. But he, too, had a purpose in mind and many hours later accomplished it. Much was to happen, though, before he did.

Toward the end of the morning, "chirp, chirp, chirp", came from his tiny throat. His voice was strong and merry. "Let's sing a song for him", some one cried. "We know a sparrow song". Joyfully the children's voices rang out and when "fluttered his wings and away he flew", was sung, what happened? He suited the action to the words but got no further than the window sill where he came down again. A burst of applause was given him and from his new landing place he began chirping very loudly. The children were enthusiastic over his attempt to fly but delighted that he was still in their midst. Just as every one was wondering what he would do next, a bird flew back and forth outside the window calling an answering chirp to his. "His mother", some one cried. "Oh! she will come in to get him", another said. Sure enough she did! Bringing food for her baby.

Then and there before anyone could say a word she began feeding him just as all mother birds feed their young. The children's eyes were wide open with astonishment as time after time the young bird opened its mouth to receive the crumbs. Would you believe that such a beautiful Nature lesson as this could take place in a school room?

When the feeding was finished the mother seemed to be giving him instructions in bird language as how to accomplish the balance of his flight back home. He listened attentively but when she flew up to the top of the window many times, he would not move. His courage was not yet screwed up to the flying point. Over and over the lesson was repeated for him before he finally did try. Then, just as unexpectedly as before, up he went and together out the window both birds flew to a neighboring roof.

The children saw them standing there and called out, "Good-bye little sparrows, come again". The birds, looking very satisfied with themselves, looked down as if to say, "If at first you don't succeed, try, try again".

Photographic Notes

BY SAMUEL BROWN

Flowers

As the days of April with their showers come to an end, they are followed by the clear, blue, brilliant days of May. With them come a new host of Nature picture subjects. Undoubtedly among the most attractive of these subjects are the buds, and the flowers that follow. It is interesting to make a series of pictures showing the development of the flower from the bud to the full grown bloom.

Distracting backgrounds can be eliminated by use of an artificial one. S. S. Panchromatic, light yellow filter

A good flower picture must show clearly all of its details and this means that careful technique in taking and finishing the negative and print is necessary. Particular attention to exposure is of primary importance; over-exposure causes loss of detail in highlights such as petals; under-exposure results in lack of shadow detail. It is important that the exposure be confined to the latitude of the film.

Since flowers come in a variety of colors, the film that is most likely to give good results is one of the many panchromatics. Especially recommended is one of the fine grain panchromatics such as Panatomic or Finopan. After development these films permit a greater degree of enlargement. Filters are also useful in flower photography. For good correction a light yellow filter gives good results, while green ones give excellent correction, particularly where the subject is red.

Any camera that can be focused close enough to give a fair sized image will serve admirably. Those that do not permit a close approach to the subject must be used with a portrait attachment. These gadgets are inexpensive and easily fixed to the camera merely by slipping over the lens. These attachments are also valuable for tiny subjects that require a close approach. Cameras equipped with a double extension bellows may be used to photograph flowers life size. Pictures of this kind are valuable for record purposes and where fine detail is a requisite.

Due to the shallow depth of focus resulting from photographing a subject from a close point of view, it is advisable to use as small a stop as is feasible. F 22 to F 32 is best and may be used in good light although under poor lighting conditions it may be found necessary to use stops as large as F 16 to F 11. Where small openings are used, the exposure must be sufficiently increased to give a fully-timed negative.

Most flower pictures are taken in the open and this means that one of the most important factors with which one must contend is the wind. Try to get your subject in a sheltered spot. If this is impossible, the subject may be protected from the breeze by a cloth. It is recommended that the slowest shutter speed should not be longer than one-half second.

Since the sun casts hard shadows, the best time of day to make flower portraits is during the early morning or late afternoon hours when the light is diffused. Soft, dull, quiet days offer the best conditions.

In most cases there is distracting background behind the flowers. Where this is so, the shrubbery and such should be removed in part. Another suggestion is to carry along your own background. Two pieces of cloth, one light gray and the other black, may be used for this purpose to good advantage. The dark background should be used where the blossoms are very light, and the lighter one may be used with dark subjects. If, however, you are planning to offer your flower pictures to a magazine, it is well to remember that many editors insist on natural habitat surroundings.

When using filters always remember to increase the exposure to compensate for the actinic power that they absorb. The factors given below are the number of times that the normal exposure *without* the filter must be increased to give full exposure *with* the filter.

Filter	*Panatomic*	*S. S. Pan.*	*Superpan*
K-1	1.5	1.5	1.3
K-2	2	2	1.6
X-1	4	3.5	4

Films

The last of the color processes to be discussed by this department is that employed by the *Agfacolor Ultra Plates*. Agfacolor Ultra Plates are supplied in sizes from 6.5 x 9 cm. to 8" x 10" and may be used only in plate holders. Until recently, these plates were supplied in a slower emulsion and special compensating filters for the different qualities of light were necessary. Lately, however, the speed has been increased by five hundred per cent and is fully corrected so that filters are unnecessary in daylight.

These plates are distinctive because of the unique method employed for securing the color transparency. The plate is first coated with a color screen. This screen is obtained by incorporating in a resinous solution particles of dyestuff in the three primary colors—blue, green and red—making a mosaic of tiny three-color filters in perfect color balance. These are so small that there are more than three million to the square inch. When this mosaic has dried and set, it is, in turn, coated with a sensitive and highly color-corrected panchromatic emulsion.

Since it is necessary to make the exposure through the color screen, the plates must be loaded into the holders with the sensitive side toward the back, or away from the lens. This means, of course, that the ground glass of the camera must be reversed in order to compensate for the thickness of the glass plate. In order to avoid damage to the plate and incidentally halation, the plate is loaded together with a piece of black cardboard facing the sensitive side.

The procedure for exposure of Agfacolor Ultra Plates is much the same as for regular black and white film. Length of exposure varies, of course, with the subject matter and the light intensity. Average outdoor scenes in bright sunlight may be photographed in 1/25th of a second at F: 6.3. Close-ups require a longer exposure. For best results one of the photo-electric cell type exposure meters should be used.

Agfacolor Ultra Plates are correctly balanced for daylight. For Mazda, photo-flash or photoflood light, the plates should be exposed with the Agfa blue filter #24, which is especially designed for this purpose.

The processing of Agfacolor Ultra Plates is an unusually interesting procedure and must carefully follow the steps as outlined by the manufacturer. Essentially the process consists of three steps: development of the plate in total darkness to bring out the negative image and reversal, which dissolves all the developed silver. After a rinse, the plate is redeveloped in the same developer originally used. The last step is carried out in the light and the result is a positive similar to a lantern slide. This positive, however, is in natural colors because the silver behind each tiny colored filter is either blackened or removed, depending on the color of the original subject. Note that fixing does not enter the process since *all* the silver is reduced in either the first or second development.

An interesting booklet regarding Agfacolor Ultra Plates describing the emulsion, processing, exposure, pointers, and other details is available without charge and may

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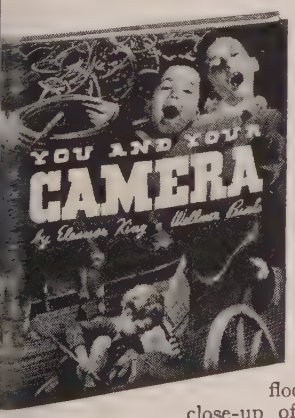

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Trade Hints and New Books

One of the most fascinating phases of photography is portraiture indoors. Two booklets entitled *Controlled Lighting* and *How To Snap Pictures Indoors and Outdoors* are available from this department. Many excellent examples of night pictures are shown, diagrams for indoor portraiture and exposure data are given and lighting equipment for various conditions is described. Both of these booklets are a definite aid and may be secured from this department without charge. Send a stamped, self-addressed envelope with your request.

Burke & James, Inc., 223 W. Madison St., Chicago, Ill., announce the addition of two brand new items to their long list of photographic equipment. The Weltini camera will be of particular interest to the miniature enthusiast. Equipped with a choice of high speed lenses, Compur Rapid shutter, built-in combination range and view finder and many more delightful features, this camera definitely deserves further investigation.

The Watson foot switch provides a means for positive light control in enlargers, photoflood lamps, photoflash outfits and any other electrical device. Inexpensively priced at $5.50.

One of the most important contributing factors to good pictures is sharpness. Correct focus, particularly with wide aperture lenses, is necessary and a range finder for measuring distances is an important accessory. E. Leitz, Inc., 730 Fifth Avenue, New York City, manufacture several models particularly adapted to both still and movie cameras. E. Leitz will be happy to send full details on request.

Photography, by Dr. C. E. K. Mees, 227 pages, profusely illustrated. Published by the Macmillan Co., 60 Fifth Ave., New York, N. Y. Price $3.00.

Photography is unquestionably one of the finest treatises of its kind to be published to date. Containing a mine of interesting information, this book will serve as an excellent background of knowledge for all who pursue photography. Dr. Mees is well qualified to tell the story of photography, having been personally connected with this field for sixty years and recognized as one of the world's foremost authorities. The first chapter concerns itself with a compact history of photography and this is followed by discussions on the manufacture of present day photographic materials, the photographic image, cinematography, a particularly interesting treatment of color photography and finally the different applications of photography, such as in astronomy, biology, medicine and many more sciences. This book belongs on your "must" list.

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New Ways in Photography by Jacob Deschin, 307 pages. Published by McGraw-Hill Book Co., Inc., 330 W. 42 St., New York, N. Y. Price $2.75.

The versatile editor of "Camera Angles" in *Scientific American* has written a new type of photographic book. He has drawn from his store of practical experience and given us a comprehensive volume covering a host of subjects. Among the scores of ideas are such unusual ones as hypersensitizing, making bookplates, ghost pictures, table top photography and many more. Comprehensive data on developing, printing, enlarging, filters, infra-red, color photography and other phases is given. This book is an excellent reference and should be in every photographic library.

The photographic department of Nature Magazine is devoted to the service of its readers interested in photography and maintains a service that renders assistance with any photographic matter. You are invited to take advantage of this service. Address all photographic inquiries to Samuel Brown, Nature Magazine, 1214 Sixteenth St., N. W., Washington, D. C.

Cordially,
Samuel Brown

Meet Our Authors

John F. Kuerzi is secretary of the Linnaean Society of New York and has published several articles on birds and travel. At present he is connected with the Outpost Nurseries, Ridgefield, Connecticut.

A. E. Andrews is an Indiana Hoosier who has found that Nature was meant to be enjoyed, not destroyed, and that perhaps modern efficiency is too much of a good thing.

Eugene S. McCartney's interest in squirrels began when several of them climbed in his fourth floor office window on the Michigan University campus and begged for their supper. At present he is editor of the University of Michigan *Press*.

Mrs. C. N. Edge, well-known for her militant conservation activities, is Chairman of the Emergency Conservation Committee with headquarters in New York City.

Ellsworth D. Lumley is an ornithologist and conservationist now connected with the Department of Biology, Lincoln High School, Seattle, Washington.

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FAMOUS YEAR 'ROUND RESORT SINCE 188

Birds Around the Year

Dr. Thomas Gilbert Pearson, President meritus of the National Association of udubon Societies, has said that *Birds round the Year,* by Lorine Letcher Butler, the most interesting and alluring Nature ok he has read in many a day. Miss Butler, deed, has adopted an attractive plan ir esenting this graceful introduction to bird re. Organizing her book on a seasonal sis, she has traced the activities of birds rough spring, summer, autumn and win- r, thus presenting a consecutive picture- norama of the birds' life cycle. Spring rds are treated in the first chapters, fol- wed by a description of the mating and sting habits and the young of the summer onths. A vivid description of the south- ard migration of autumn and the descrip- on of the hardier species that remain rough the winter and the resources Nature ovides to support them rounds out the ory of *Birds Around the Year.* Incidental the main topics, which hug rather closely astern North America, are others that will quaint the reader with birds of the moun- ins, the plains and the sea. Published by e D. Appleton-Century Company, the ook is available for $2.00.

Maryland Snakes

The Natural History Society of Maryland nnounces publication of *Snakes of Mary- nd,* by Howard A. Kelly, assisted by Har- C. Robertson, who cooperated in supply- g field notes, and Audrey W. Davis, who ssembled the data for the pamphlet. It is oncise and complete, containing information n the origin of snakes as an order, their istribution and habits; methods of identi- cation; devices for attacks and protection; escription of the species of the region; nake poisons and the treatment of snake ites, and a bibliography. The booklet is ailable from the society at 2103 Bolton reet, Baltimore, Maryland.

How to Attract Birds

No bird lover who keeps his back yard eding station stocked with food in the opes of attracting his feathered friends uld be without Alvin M. Peterson's little ook entitled *The ABC of Attracting Birds,* fine volume that tells us how to build mple houses and bird baths and how trees, ushes and vines act as bird attractors. The st chapter gives us information on how to rm an effective bird sanctuary. Woven rough the material are intimate glimpses f the bird lover at work. The book is vailable from the Bruce Publishing Com- any, Milwaukee, Wisc., for $1.50.

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TEN YEARS AGO THIS OCTOBER

It is interesting to turn back the pages of the years and read the record of a business. For time has a way of testing purposes and policies. Good years and lean reveal the character of men and organizations. The fundamental policy of the Bell System is not of recent birth—it has been the corner-stone of the institution for many years. On October 20, 1927, it was reaffirmed in these words by Walter S. Gifford, President, American Telephone and Telegraph Company.

"The business of the American Telephone and Telegraph Company and its Associated Bell Telephone Companies is to furnish telephone service to the nation. This business from its very nature is carried on without competition in the usual sense.

"These facts have a most important bearing on the policy that must be followed by the management if it lives up to its responsibilities.

"The fact that the ownership is so widespread and diffused imposes an unusual obligation on the management to see to it that the savings of these hundreds of thousands of people are secure and remain so.

"The fact that the responsibility for such a large part of the entire telephone service of the country rests solely upon this Company and its Associated Companies also imposes on the management an unusual obligation to the public to see to it that the service shall at all times be adequate, dependable and satisfactory to the user.

"Obviously, the only sound policy that will meet these obligations is to continue to furnish the best possible telephone service at the lowest cost consistent with financial safety. This policy is bound to succeed in the long run and there is no justification for acting otherwise than for the long run.

"Earnings must be sufficient to assure the best possible telephone service at all times and to assure the continued financial integrity of the business. Earnings that are less than adequate must result in telephone service that is something less than the best possible.

"Earnings in excess of these requirements must either be spent for the enlargement and improvement of the service furnished or the rates charged for the service must be reduced. This is fundamental in the policy of the management.

"The margin of safety in earnings is only a small percentage of the rate charged for service, but that we may carry out our ideals and aims it is essential that this margin be kept adequate. Cutting it too close can only result in the long run in deterioration of service while the temporary financial benefit to the telephone user would be negligible.

"With your sympathetic understanding we shall continue to go forward, providing a telephone service for the nation more and more free from imperfections, errors or delays, and always at a cost as low as is consistent with financial safety."

BELL TELEPHONE SYSTEM

In May—Rowland E. Robinson *By* HOWARD ZAHNISER

IT IS a poignantly tragic thing to be blind in May ("im wunderschönen Monat Mai"), and there are many kinds of blindness. Rowland Evans Robinson could see nothing with his kindly blue eyes during the last few Mays of his life, and yet he saw so clearly that during these years he wrote all but one of the books that can still bring to any reader a more vivid seeing of forests, fields, streams, flowers, birds, four-footed and six-legged creatures, and "folks". Robinson once told a visitor, "I'm glad to see you; for I call it seeing," and a reader of those books written in "blindness" with the aid of a grooved board knows that the author had not mis-spoken. For sixty years he had made such good use of his eyes that, when they failed him, he could look into memory—and see.

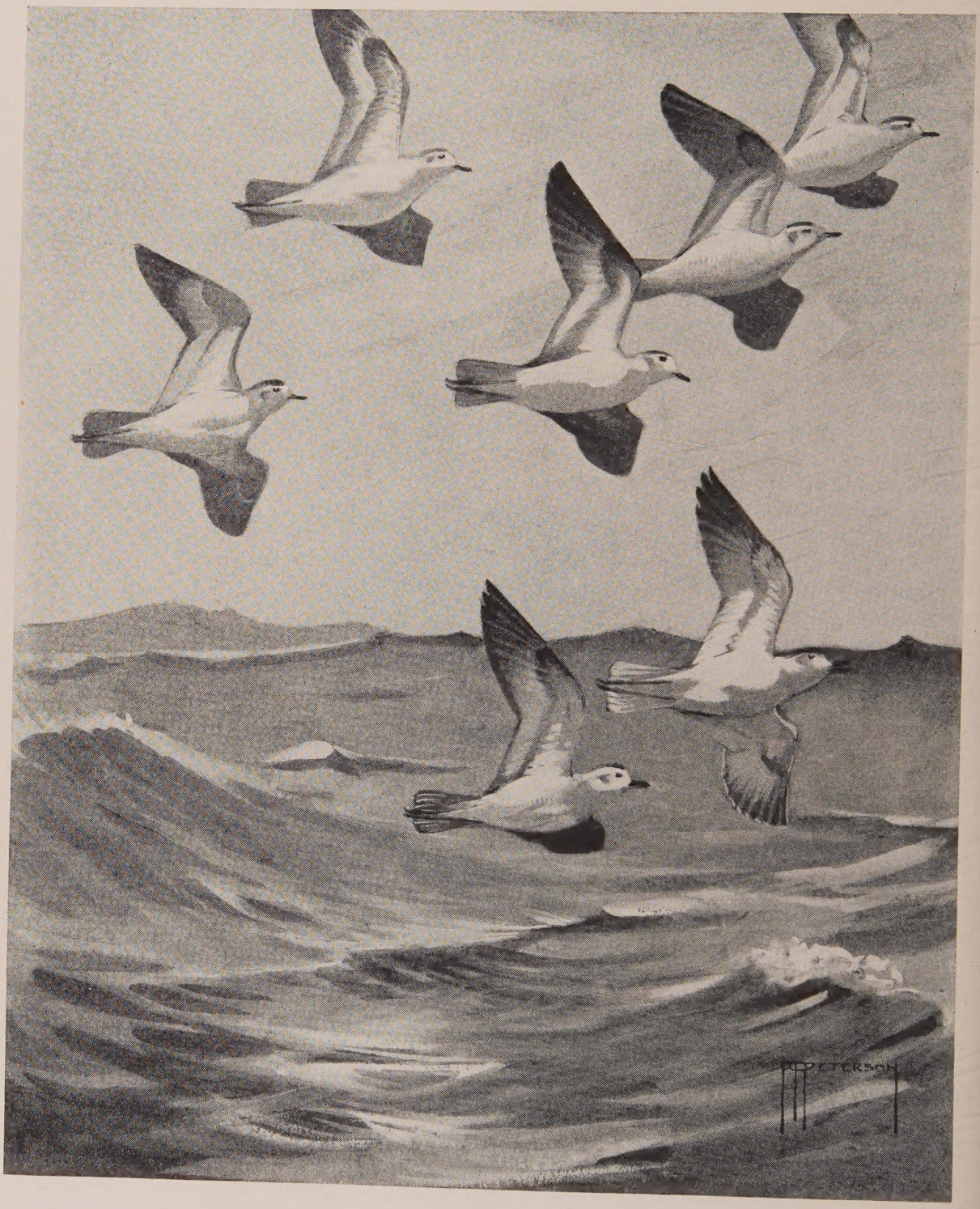
There is no month when the out-of-doors is more clearly conducive to seeing than in May, none when the outdoors person cares less for books. Yet when an indoors day comes (perhaps like the May day of rain described in Robinson's sketch, "A Rainy Day", in *Danvis Folks*), if one will wander through *Uncle Lisha's Shop, Sam Lovel's Camps, Danvis Folks, Uncle Lisha's Outing, Sam Lovel's Boy, In the Green Wood, A Hero of Ticonderoga, Out of Bondage, Silver Fields, Hunting without a Gun, Forest and Stream Fables,* and *In New England Fields and Woods,* he will find a plenty that he has looked at and not noticed. Robinson's sketch of "May" and its following accounts of "The Bobolink" and "The Golden-winged Woodpecker" from *In New England Fields and Woods;* his chapters XIV to XIX in *Danvis Folks,* including "Going Fishing"; his sketches "In the Spring Woods" and "Early Spring" in *Hunting without a Gun;* and his chance descriptions in other works are, indeed, so many sight-seeing excursions. For once, at least, one can safely recommend that the "blind lead the blind"—and "the ditch" may be a scene of unsuspected beauty.

Seeing is more than sight, and Robinson had that added affection for the out-of-doors that made his sight a seeing that was insight, too. Sam Lovel explains it for Robinson in the rhythmic New England speech that Robinson has treasured up for generations that can never hear it elsewhere. "It comes nat'ral fer me," says Sam (and Robinson, too), "tu run in the woods. . . . The air o' the woods tastes good tu me, fer't haint ben breathed by nuthin but wild creeturs. I luffter breathe it 'fore common folks has. The smell o' the woods smells good tu me, dead leaves 'n' spruce boughs 'n' rotten wood, 'n' it don't hurt none if it's spiced up a leetle bit wi' skunk an' mink an' weasel an' fox p'fum'ry. An' I luffter see trees 'at's older'n any men, an' graound 't wan't never plaouwed ner hoed, a-growin' nat'ral crops. 'N' I luffter hear the stillness o' the woods, fer 'tis still there. Wind a-sythin', leaves a-rustlin', brooks a-runnin', birds a-singin', even a blue jay a-squallin' haint noises. It takes folks an' waggins an' cattle an' pigs an' sech tu make a noise."

Robinson had also that jealousy of civilization that many may have thought peculiar to later lovers of the wilderness. In the nineteenth century he was phrasing accusations that might be current propaganda for restoring wildlife and forests and preserving wilderness areas. *In New England Fields and Woods* is replete with pleas for sharing the out-of-doors with all creatures, and for preserving their homes—not only for the sake of the wildlife but also as good policy. "Some swamps at great expense," he says, "may be brought into tillage and meadow, but nine times out of ten, when cleared of the lusty growth of the woods, they bear nothing but wild grass, and the streams that trickled from them all summer long in their days of wildness show in August only the parched trail of the spring course." And he points more prophetically perhaps than he knew to the fact that "it is more profitable to keep a lean or thin soil that will grow nothing but wood, growing wood instead of worthless weeds".

Robinson died in 1900, on October 15, in the same room in which he was born on May 14, 1833. He spent nearly all his life in rural surroundings, on the farm near Ferrisburg, Vermont, that his Grandfather Robinson cleared in 1796. With a talent for drawing, he had found employment in New York from 1866 to 1873, but he was more truly an orchardist and dairy-farmer. His illustrations of rural scenes and characters add more than a quaint interest to the centennial edition of his works begun in 1933 (by the Tuttle Company, Rutland, Vt., under the editorship of Llewellyn R. Perkins), and yet his best-remembered drawings may be his good-humored sketches drawn in butter in tubs sent to market. The writings, for which he is now celebrated, were not begun until 1877, and in more ways than one they are memory sketches of Vermont life in boyhood days. Though he wrote an enduring history in *Vermont: A Study of Independence,* his greatest contribution to human happiness is undoubtedly in his outdoor sketches and those of Vermont characters and their ways of living and communicating their thoughts to one another.

There is no profit in distinguishing between Robinson's outdoor sketches and his other works, for though he wrote much that was solely concerned with Nature, he seems never to have written anything without an awareness of the world of living wild things. Many bits of Robinson's writings on spring alone can try one's tastes, yet none can seem more fitting and proper, or more consummately and concisely descriptive of the entire progress of the season, than a paragraph that one runs across in *A Danvis Pioneer,* as Robinson is telling of Josiah Hill's "solitary" life in (Continued on page 317)



"THE SERRIED RANKS CLOSE UP A TRIFLE AND THE CALLS ARE MORE FREQUENT. THAT NIGHT THE STORM BREAKS OVER THE OCEAN AND THE BIRDS BRAVELY FIGHT IT OUT"